Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED EVERY FRIDAY BY
THE RAILROAD GAZETTE (INC.), 83 FULTON ST., NEW YORK.

CHICAGO: Plymouth Bldg. CLEVELAND: Williamson Bldg.
LONDON: Queen Anne's Chambers, Westminster.

W. H. BOARDMAN, *President and Editor.*
E. A. SIMMONS, *Vice-President.* RAY MORRIS, *Sec'y and Man'g Editor.*
R. S. CHISOLM, *Treasurer.*
The address of the company is the address of the officers.

Subscription, including regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico.....$5.00 a year.
Canada .....$6.00 a year.
Foreign Edition, London.....£1 12s. ($8.00) a year.
Single Copies.....15 cents each.

Entered at the Post Office at New York as mail matter of the second class.

VOL. XLVIII., No. 6. FRIDAY, FEBRUARY 11, 1910.

CONTENTS

EDITORIAL:
Editorial Notes 291
Further Powers of the Railway Commission 292
The Close of a Railway Comedy 293
The Croton Collision. 294

LETTERS TO THE EDITOR 295

ILLUSTRATED:
The Division Superintendent's Office and the Superintendency .. 299
The New Panama Railroad 303
Steel Box Car for the Union Pacific 308
Tractive Power of Locomotives 310
New Locomotives for the Chicago Great Western 313
Chicago & North Western Terminal 314

MISCELLANEOUS:
Train Accidents in December. 297
Government Regulation of Railway Corporations 306
Tools and Supplies for Cabin Cars 314
Foreign Railway Notes 313, 314

GENERAL NEWS SECTION 319

SUPPLY TRADE NEWS 331

In another column Mr. York submits for discussion a rail section with a supported joint. He does not attempt to carefully design that rail section; his drawing might be called a conventional drawing or suggestion for a tendency in designing. He proposes to return nearly to the old pear-headed section, to hold the rail in line with fish bars only, and support the joint firmly and directly at its base. Being a rolling-mill man, his main aim is to make it easier and cheaper to roll a good rail. It is obvious that to preserve the same height as present rails and also to insure the same strength as a girder, additional metal is needed in this proposed section. Mr. York calculates it at about 10 per cent. increase, and this increase he believes to be balanced by longer life. It is noticeable in this connection that ferrotitanium rails, which are believed to be more enduring, cost about 10 per cent. more than ordinary rails. Mr. York is probably wrong in thinking that this section "does not entail any radical changes for its installation." A good deal of study and skill will be needed to adapt it to present methods of frogs, switches, detector bars and the like, and, in the matter of bonding for electric circuit the difficulties seem to be great. Nevertheless, this subject seems worthy of further study and criticism.

The milling-in-transit—or, more briefly, the transit—privilege has grown up to meet commercial needs. It has served, and still serves, a useful purpose. It could not be abolished without effecting a revolution in methods of doing business that would cause much harm. But the recent hearings before the Interstate Commerce Commission show that the privilege is being widely and grossly abused. Under cover of it not only the spirit and intent, but also the very letter, of the Interstate Commerce act, are being flagrantly violated. It is being constantly used as a means of getting rebates. These violations of the law seem sometimes to be accomplished with the connivance of the railways. In most cases, they seem to be accomplished despite and in fraud of the railways. The conditions disclosed amply justify the commission in entering on a through investigation of the entire use and abuse of the transit privilege. While it ought not to be abolished, while perhaps the rules regulating it that the commission lately adopted are not practical, it is evident that some restrictions must be imposed on it, if it is not to be employed to effect wholesale unfair discrimination and rebating. If the necessary restrictions impose hardship on commercial interests, those interests will have no one to blame but themselves; it is they who have made restrictions necessary. No doubt, the most effective way of making unnecessary vigorous restrictions, which would interfere as much with legitimate as with illegitimate transactions, would be for the commission to institute prosecutions that would result in the severe punishment of many of those who have been deliberately and knowingly violating the law. The punishment of those who violate the law, whether railway men or shippers, is needed, not only to secure obedience to the law, but to protect the large majority of shippers and railway men, who sincerely wish to obey its spirit as well as its letter, against those who are willing, in order to gain a temporary advantage over competitors, not only to take the risk of going to prison themselves, but to excite further public hostility against railways and invite further restrictive legislation that will be equally injurious to shipper and carrier.

The fact that returning prosperity seems to be bringing with it the usual crop of labor troubles warns us that we have not yet solved the problem of using human labor efficiently, and we ask ourselves if we have really made much progress in this direction. The earliest method of utilizing human labor was that of slavery, where the stronger compelled the service of the weaker, and the theory that "might makes right," so long the guiding principle of all human action, gives place very slowly to the more modern conception that fair treatment of the individual is in the long run best for the community in general. The workman who feels that his job is the best he can get, and the employer who feels that he has the best man he can get for the job, form a combination which insures harmony, efficiency and prosperity. The real labor problem is how to bring about this combination. Under these conditions the workman tries to make his job permanent by complying with the wishes of his employer, and the employer is careful to avoid actions that tend to make the workman dissatisfied. Failure to regard the problem from this standpoint, and a disposition to regard the hiring of labor as being in the same category as horse trading, in which each party tries to get all he can regardless of what he gives, is the great obstacle to co-operation between employer and employee. As long as the employer asks only how cheaply he can get his workmen, they in turn ask what is the minimum amount of work they can do and hold their jobs. This is the normal condition under our present system of handling labor, and we should not only not be surprised at the difficulty of procuring efficient workmen under it, but rather that our labor troubles are so few. Under any reasonable system of management it is not the cheap workman who

is most profitable, but the trained, high-priced workman who renders efficient service. This has been so thoroughly demonstrated that many companies are now carefully training workmen for even the most subordinate positions. The habit of disregarding individual efficiency and limiting the pay of good men by what the poorer ones can earn, must be modified before we can really start to solve labor problems.

Shippers of dressed poultry, butter and eggs have complained to the Interstate Commerce Commission about the rates charged them on shipments from the Missouri river to Chicago and the East. The rates of which they complain are 45 cents on mixed carloads of dressed poultry, butter and eggs from the Missouri river to Chicago, and 75 cents, Chicago to New York, making a total of $1.20 from the Missouri river to New York. On butter and eggs the rate, Chicago to New York, is 65 cents, making a total on these commodities, Missouri river to New York, of $1.10. These rates are compared by the complainants with those on dressed meat. The local rate, Missouri river to Chicago, on dressed meat is 23½ cents. The proportional rate, Missouri river to Chicago, is 18½ cents; to which is added the local rate, Chicago to New York, of 45 cents, making a total rate, Missouri river to New York, of 63½ cents. The complainants allege that the rates charged them are unduly high as compared with those on dressed beef. And they are undoubtedly right. The vice of the situation, however, is not in the rates on dressed poultry, butter and eggs, which are not excessive, but in the rates on dressed meat from the Missouri river to Chicago, which, as repeatedly has been pointed out in the *Railway Age Gazette*, are too low. These rates on dressed beef were fixed by a contract entered into by the Chicago Great Western and the packing companies some years ago. In consideration of the reduction then made by the Great Western the packers agreed to give it a certain percentage of their shipments for five years; and other roads, of course, had to make similar reductions. There never was any justification for the cut made by the Great Western in the rates, except that its management could thereby get a larger share of the business. The original contract has expired. The Great Western has passed into the hands of a new management. The time, therefore, it would seem, is ripe for a reasonable advance in rates on dressed meat. The existing rates always have been, and are to-day, indefensible on any fair principle of rate-making, and are unduly discriminatory in favor of the meat packers and against the shippers of other commodities. As long as they exist they will be made the basis for invidious comparisons with other and higher rates. It will be alleged, and truly, that if they are high enough, then the rates, not only on dressed poultry, but on fresh fruits and other perishable articles, must be too high. It will be charged, and perhaps truly, that the main reason why they are kept in is that their main beneficiaries are certain large concerns which, because they are large, have more "pull" with the railways than would a more numerous body of small concerns shipping equal quantities of the same commodities. If the rates on dressed beef were to-day as much as 25 cents and 35 cents, and a complaint should be filed with the Interstate Commerce Commission asking their reduction to the present basis of 18½ cents and 23½ cents, does anyone doubt that the railways would oppose the reduction? It is beyond serious question that they would say that it would work unfair discrimination against shippers of perishable commodities and compel them to render an unusually expensive service for unremunerative rates. As long as the railways keep in, here and there, rates which every traffic manager knows are too low, and which often exist mainly or solely for the benefit of large shippers, they will find it difficult to prevent reductions in other rates which are not too low, and impossible to defend themselves against the charge of unjust discrimination.

FURTHER POWERS FOR THE RAILWAY COMMISSIONS.

We print this week part of an important address by Professor Emory R. Johnson on government regulation of railway corporations. Professor Johnson is not only a sound student of railway affairs, but his habit of mind is conservative and he is not apt to be led astray by temporary and fluctuating economic situations. His review of the trend of railway regulation in this country is admirably clear and concise. Yet when he urges various increases of power for the Interstate Commerce Commission because they are logical, it seems to us that his argument scarcely rests on sound practical grounds. The logical, in government affairs, carries a very low quotation and there is often no market for it at all. Our own belief is that the great value of all our railway regulating commissions, state and national, lies in their service in taking away the feeling of public oppression at the hands of the corporations. The people in this country never have been oppressed by their corporations, but there have been countless cases of small wrongs which have become magnified into great popular causes because the ordinary processes of law were well out of the reach of the smaller shipper. But when actual control of the public relations of the railway corporations was placed in the hands of a commission which was chosen directly or indirectly at the polls, a great part of this popular resentment died out, and it ought nearly all to disappear in the next five or ten years, just as it has nearly disappeared in England.

The farmer and the small shipper now have only their own commissions to blame if the railways act in a manner which seems to them unfair, and they must take out their wrath on the commissioners and not on the corporation. This is a wholesome situation, and is by far the most important service which the commissions perform. The actual effect of their rate making will probably be to cause the general level of rates throughout the country to be slightly higher than it would be if there were no commissions at all, because railway managers are slow to make reductions for temporary or special reasons if they are going to be obstructed in restoring rates to former levels; the more rates are controlled by commissions the less railway managers will be inclined to try experiments with them for purposes of development. The shadow of the Railway and Canal Commission has frightened away many reductions in British rates.

We also disagree with Professor Johnson's advocacy of government regulation of railway capitalization. Professor Johnson speaks of the admirable work done by the Massachusetts Railroad Commission; perhaps he forgets the report of the special commission on commerce and industry. The Massachusetts Anti-Stock-Watering Act of 1894 provided that whenever a steam railway, a street railway, or a gas, electric lighting, aqueduct, water, telegraph or telephone company should increase its stock by an issue exceeding 4 per cent. of the existing capital stock, the amount necessary for the contemplated purpose should be offered to shareholders at its market value at the time, as determined by the Board of Railroad Commissioners, but that no share was to be sold or issued at less than par. The feeling throughout the state gradually became widespread that while this law effectually prevented stock-watering, it was a millstone around the neck of industry, and in the summer of 1907 an exceedingly able commission was appointed by the legislature to find out whether this law or some other thing was opposing the material development of the state.

This commission reported in March, 1908. It found, first, that when the state prescribed a price above par as the minimum basis on which new stock could be offered, it thereby put itself in an impossible position with regard to any subsequent efforts to determine what was a fair rate upon investment, and consequently impaired its own efforts to control the service performed by the corporation. It found, also,

that capital had been kept away from the legitimate enterprises of the state by the requirements of the law, and it placed emphasis on the point of view that the concern of the public with what a railway earns is very slight, whereas its concern with what the railway does is very great. The commission also added a modest recommendation that the idea of punishment be left out of new corporation legislation entirely.

Public regulation of railway capital cannot affect freight charges, as we have often pointed out; it can only serve as a protection for the individual investor, and as a safeguard for the community against the general disadvantages arising from the presence of an insolvent corporation. But it is almost, if not quite, impossible to frame laws rigid enough to accomplish any useful protection of this kind without incidentally doing vastly more harm than good. After all, laws to prevent overcapitalization are much like laws to prevent usury, or to fix the price of corn; if enforced at all, they usually have an opposite effect from what was intended. The railway which is allowed to issue no capital except for the actual cost of specific additions and betterments, for example, will see to it that no additions and betterments escape uncapitalized. But it is just this practice which is bringing the British railway system closer to insolvency every year! Parliament has always scrutinized closely all railway share and debenture issues, yet the British railway system is seriously overcapitalized; our government does not scrutinize railway securities at all, and yet it is quite certain that the railways of the United States could not be replaced for the sum total of the securities issued against them.

THE CLOSE OF A RAILWAY COMEDY.

"At the date of my annual report for 1908 there were pending four cases which arose out of the controversy between the commonwealth and the New York, New Haven & Hartford Railroad Company. Two of these cases were bills in equity against the Worcester & Webster and Webster & Dudley street railway companies. * * * Since the ownership and control (of the Boston & Maine shares) have been expressly sanctioned by the legislature there is no further merit in the pending information already referred to; and that proceeding, as well as the bill in equity directed against the Worcester & Webster and the Webster & Dudley street railway companies, respectively, may properly be dismissed."—Report of Attorney-General Malone of Massachusetts for the year ending January 19, 1910.

A few months only have gone by since Attorney-General Wickersham, of the United States, announced the discontinuance of the federal suit against the New York, New Haven & Hartford to prevent that corporation's control of the Boston & Maine. Attorney-General Malone, of Massachusetts, now announces the discontinuance of the state suit aimed at the same corporation's control of a large group of the Massachusetts street railways. Both the attorneys-general, federal and state, have assigned, as ground for dismissal of the suits, respectively, the Boston Holding Company plan ratified by the Massachusetts legislature last year; and, in both cases, the reasoning, even to the laical mind, is delightfully illogical. In the federal case at bar what had a state's action to do with questions of restraint of trade and of competition in New England raised by the Sherman act and when there had been absolutely no change in the physical relations of the railway lines? And what had the state suit bearing upon the trolley holdings to do with the Boston Holding corporation expressly organized to take over a specific and limited set of steam railway shares? In both these cases, one involving the substantial railway monopoly of New England, the other the ownership or control of some 500 miles of Massachusetts trolleys, the two prominent law officials have obviously used the Boston Holding Company act as a very tenuous screen for a retreat.

So ends, for the time being at least, a railway comedy which, but for the magnitude of the interests involved, would have elemental humors worthy of opera bouffe and the melodious strains of an Offenbach. Through its mazes reaching over years of time memory absorbs a few of its most salient incidents. There was the original legislative outburst following the New Haven's purchase of the 110,000 shares of the Boston & Maine; next the restraining act which tied up the main situation; then the grist of lawsuits leveled at both the Boston & Maine control and the Massachusetts trolley holdings, the findings of the state courts, the legal battle of the Connecticut and Massachusetts charters of the defendant corporation, reams of briefs, tons of legal verbiage, fat fees of the lawyers. Massachusetts politics kept hot pace with the courts. The "merger," with the trolleys annexed, was the focal point of a warm state campaign with voluminous and high flown oratory on the stump. But the humor of backsight with its broad smile pauses longest on the Massachusetts chase for legal and proven ownership of the Boston & Maine shares and of the trolleys, and the defendant schemes of masking that ownership. Never on English hunting ground was chase for the elusive fox more ardent than the Bay state's search for that statutory ownership "direct or indirect" under the terms of the law. The New Haven stockholder, pro rata owner of certain securities representing many millions, went to bed almost daily without knowledge where next morning those interests would vest. But at last they found refuge in "individual" ownership—the trolleys in the separate hands of controllers of the New England Investment & Security Corporation, the Boston & Maine stock in the hands of John L. Billard, of Meriden, Conn. who, from the lowly eminence of a local financier, leaped with sudden bound to the peak of a great fiscal railway magnate. The final compromise and the transfer of the Billard shares to the new Boston Holding Company are too recent and familiar to need review.

Out of the mixed gravities and humors of this New England railway tale, big with future events, come two important suggestions. One is the apparent effectiveness of individual ownership fortified by complete technical title, as a bar to legal procedure directed at corporation ownership. The corporation ownership may be a practical, as distinguished from a technical fact. But the transfer to an individual if unattended with contract, resting on agreement merely implied, the purchase money passing and the whole transaction founded upon a "sympathetic" relation looks like a serious stumbling block to prosecution, whether such prosecution is laudable or the reverse. In the New Haven suits, now at an end, one of which was for a time a depressing force in Wall street, it cannot, of course, be positively asserted that the private holding device was an element in the dismissal. But the outcome at least strongly denotes it. A "sympathetic relation" in stockholding cannot be sued, enjoined, replevined, courts cannot issue decrees against a sensation or motive. But the plan has its counter dangers. The "sympathetic relation" may itself change. It is founded on an uncertain personal equation. It is the victim of disputes and disagreements which may spell antagonism instead of concord and with vast powers in the individual hand. And, beyond, lie such perilous contingencies as death, the tying up of estates and interests and equal menace to heirs and to the corporation which has risked the personal chance of death or survival. In the New Haven suit, for example, the death of Mr. Billard, a man well advanced in years, would have created a situation interesting not to say calamitous. On the whole we are unlikely, in the future developments of railway litigation in this country, to see the "personal" transfer employed save possibly as a temporary device and in extreme emergencies.

The bigger and broader lesson of the outcome in Massachusetts is the arrant absurdity of injecting acute and demagogical politics into a matter, however important, of railway readjustment. Indeed the more vital such a readjustment is the more imperative does it become that it should be referred to cool brains and the trained intelligence. Massa-

chusetts had its period of legislative and popular upheaval over the New Haven suits and for a brief while entered upon almost volcanic conditions. Facts and figures went by the board and shouting folly went to the masthead. Politics in one shape or another has delayed for years an adjustment which with justice and protection both for the corporation and the state might have been arranged in a fortnight. In the end the stage got tired over the snarl of litigation and the labyrinth of controversy, and the settlement followed of which the legally illogical but wise withdrawal of the trolley suits marks a final stage. The conflict has been long, costly, vexatious. It has left behind some side questions like the scope of conflicting railway charters of Massachusetts and Connecticut yet to be clarified. But as precedent and warning with its teaching for scientific instead of emotional treatment of big railway disputes the lesson, with its final gains, may be worth its intermediate loss.

THE CROTON COLLISION.

The rear collision at Croton, N. Y., December 31, reported in another column of this issue* has been the subject of much notice; first, because it was near New York City and caused the death of a prominent man, and second, because it occurred on a road where the block system is well managed. As the Public Service Commission of the state is investigating the case, and especially as one important detail, the qualifications of the engineman, has not yet been inquired into, we shall not undertake at this time to draw final conclusions concerning it; but certain features may be noticed.

First is the investigation. The officers of the road made their own inquiry, of course. The coroner made his, and has held Engineman Flanagan for the grand jury, to be charged with manslaughter in the second degree. He released the fireman and the flagman, holding them blameless. He made some useless recommendations about signaling. The grand jury will, no doubt, make a searching inquiry, for, it is said, the heirs of the passenger who was killed, Spencer Trask, a distinguished citizen and banker, are going to press vigorously for adequate punishment. The State Public Service Commission has already held two all-day hearings, and its members visited the scene of the collision. They also had a special train run to illustrate the use of power brakes. Four commissioners, salaries fifty dollars a day, took part in these hearings, though only one of them is acquainted with railway operation. Two of their technical assistants asked a very few questions. All of the useful functions of the coroner, the district attorney and the four commissioners could be much better performed by one, or at most two, expert examiners. In England one investigator serves in nearly all cases, with very satisfactory results. Legislatures nowadays seem to want special commissioners to deal with all sorts of petty details and the New York State Commissioners seem disposed to carry out that wish. The latest proposition in the legislature at Albany is that the commission shall decide, in each country village, whether each local newspaper has enough circulation to justify the state in compelling the railways to advertise in it!

The second obvious conclusion from the facts in this case is that investigations of accidents not only should be made by a single competent body, but should go deeper than any state railway commission ever goes. The message sent by the despatcher to Engineman Flanagan, with the despatcher's and the engineman's testimony, indicate that enginemen are not very strictly disciplined, and that when discipline is administered the job is not always skilfully done. A train of special importance should be entrusted only to a man specially well qualified; at least well qualified enough to be trusted to use his own judgment throughout a single trip. If a runner were dull, a message like that here shown would be more likely to "rattle" him than to safely improve his speed. If Flanagan's failure to run fast enough was due to lack of explicit instructions the fact would seem to indicate loose practice at the starting point. The testimony of the fireman indicates that the rule requiring both enginemen and firemen to observe fixed signals was not carefully carried out; and the testimony of other witnesses tends strongly to discredit the statements of the men on engine 2153 that signal 35.21 was clear. In short, the only satisfactory investigation in a case like this is one which goes thoroughly into the character, conduct and ability of the engineman, and all who are vitally concerned, for several years back; far enough back to show what basis there is for the conclusion that each employee was fully fitted for his responsibilities.

The subject of flagging was illuminated significantly. The passenger train had been stopped four or five minutes. The flagman could see a clear road 2,000 ft. back and could see the semaphore signal properly displayed at stop. The rule gives the flagman considerable discretion (unless the conductor is at hand and instructs him). If any discretion is to be allowed at all, what better exercise of it could be expected than resulted in this case? Is it any wonder that the coroner let the flagman off? As to enforcing a flagging rule which allows no discretion to the flagman, everybody knows that it is a failure. The general and utter absurdity of our flagging rule is shown by the passenger conductor's testimony, that passenger trains were habitually stopped at block stations, yet that flagman did not go back. That was before this collision occurred. Since that date flagmen are as energetic as dynamite bombs. One passenger train, in running from Buffalo to Albany, 300 miles, left nine flagmen behind, one after another, the conductor repeatedly telegraphing ahead for fresh men to take the places of those left. The testimony at the hearings showed that the flagging rule was managed on the Pennsylvania about the same as on the New York Central. If two of the biggest and richest roads thus experience difficulty, what can be expected of the "average" road? The simple fact that the rule has a different effect immediately after a collision from what it has immediately before one, condemns the whole principle. It is high time to perfect the space interval and to give up the attempt to secure safety by the combination of the space interval and the time interval—two things that will not mix.

The fact that three-position signals had been substituted for two-position north of Croton a few weeks before will be made the subject of considerable discussion in connection with this collision; but it is doubtful if there can be any profit in such discussion. We do not understand that either the engineman or the fireman claims to have been deceived or confused by the new arrangement, but there will be those who will say that such may have been the case nevertheless. So far as this particular collision is concerned the point can hardly be called important, for Flanagan had a clear view of the home signal at stop—an aspect which is the same under the new as under the old system—as well as of the rear end of the rear car of the standing train, for full 2,000 ft. before reaching them; and against an engineman who runs into a preceding train under such circumstances there is a strong presumption of carelessness—unless his mind had failed. The fireman's testimony that he thought the engine would stop before striking the passenger train lends color to the theory that in the engineman's mind there was a definite intention to stop at the home signal, but that he simply overestimated his brake power, having been used to running long trains and having never before had occasion to brake one like this—a heavy engine and only 13 cars.

But on the general question of changing these aspects there can hardly be two opinions. If the three-position upper-quadrant arrangement is superior to the two-position lower-quadrant in sufficient degree to warrant the expectation of a considerable increase both in safety and economy, it is the duty of railways generally to adopt it; and this is so even if it were necessary to limit the speed of trains temporarily. That

*Some of the testimony that was given at the investigation of this accident will be found on page 254, last week's issue.

every engineman (and fireman) should be thoroughly instructed on the aspects, and repeatedly tested, goes without saying. Indeed, taking things as we find them on most roads —a considerable percentage of enginemen possessing only imperfect knowledge of the signal aspects with which they have to deal—all enginemen ought to be thoroughly instructed on general principles; a change in aspects ought to be welcomed by the trainmaster as a valuable opportunity to invigorate his general discipline. A number of roads already have adopted the upper quadrant and it seems reasonable to ashume that its use will constantly spread. There is no possible reason for confusion if the engineman has three seconds to think; and the occasions when the engineman of a freight train does not have five times that length of time to think, and when a mistake would lead to a collision, are so rare that they need not be considered. In the old system 45 deg. downward means all-clear (because through slipshod management 45 deg. is accepted as meaning the same as 60 deg.); in the new the only diagonal aspect (45 deg. upward) means all-clear for a limited distance; but the upward position certainly is violently different from the downward; and the limited length of road signaled clear under the new arrangement after all is, in practice, the same as the distance which was cleared under the old. That is to say, if an engineman, seeing 45 deg. under the new, mistakenly assumes that it is a clear signal under the old, he should naturally assume a clear track only to the next signal, which he is free to do—because in assuming the signal to be one of the old style, he is also bound to assume that it is a home signal, not a distant, for it does not have a fishtail end. This is assuming daylight experiences. At night the new 45-deg. indication does not resemble the old all-clear indication.

Another fact sustaining the view that changing from two-position to three is not a severe tax on the engineman is the experience of the Pennsylvania Lines west of Pittsburgh, where, on 25 miles of busy four-track road, the change was made ten years ago without difficulty, and without changing from lower to upper; the lower quadrant practice was (and is) retained.

In considering the seriousness of the tax on the engineman's mind it must be remembered that, with reasonable discipline, the problem of seeing and interpreting signals in a very short time and under exciting circumstances does not occur except in academic discussions. In actual practice the runners who travel at high speed and who must meet these theoretical perplexities are bright men who meet them successfully without any coaching. They are level-headed runners of long experience. If they are not men of good quality the superintendent is the man who is responsible; for there is no justification for entrusting fast trains to any but tried enginemen.

Letters to the Editor.

LIMITED SPEED OF PASSENGER LOCOMOTIVES.

Boston, Mass., Feb. 4, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In my letter to you published February 4 on the above subject I quoted some matters from a paper of mine before the American Society of Mechanical Engineers relating to the performance of the Strong locomotive from memory, thinking that I remembered them correctly. After sending you the letter, however, I looked them up and found that I had overstated the matter.

The sentence referring to the increase in the indicator diagram area should have given this as 35 per cent. in excess of diagrams from the ordinary locomotive, and in another place I should have stated that at high speed I should anticipate nearly 50 per cent. more area than the typical indicator diagram.

F. W. DEAN.

"COST OF SERVICE" AND THE ALTON CASE.

New York, Feb. 5, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I have read with very great interest the article on "Cost of Service." It is a matter for regret that you could not have had the opportunity to make this altogether lucid and sane comment in direct reply to Mr. Clements before the Economic Club the other evening.

Indeed, it seems to me that the argument may be fairly pressed even further; for, even in the case of railways furnishing exclusive service to a territory, such roads are almost invariably engaged in the process of building up a contributory traffic. Their problem is to create business, and I believe the facts will show that in railway practice that is done by processes of inducement and not by the imposition of the highest possible traffic rates. I have, for instance, in my own experience, seen a ranch territory brought up in value from about a dollar and a half to eight dollars per acre in the course of some six years by a long spur line operated without any kind of competition. To me it all appears to be a plain question of supply and demand and you have illustrated this very incisively in your comments on the Alton and the L. & N. roads. Mr. Clements' views reminded me very much of an evening I once spent some years ago in a little hotel in Texas, listening to the damning of the railway by a group of cattlemen who owed pretty much all they had, and it was considerable, to the railway which had brought their lands into touch with the market.

C. F. GODDARD.

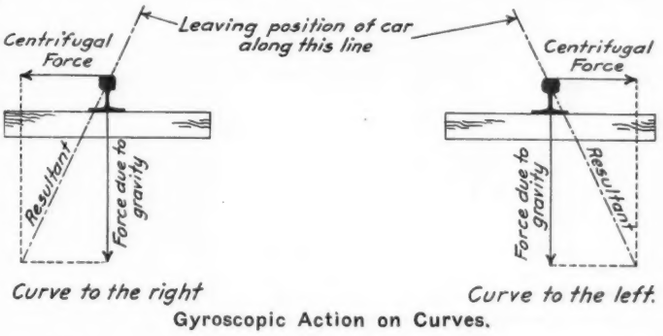
GYROSCOPIC ACTION ON CURVES.

New York, Feb. 3, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Referring to your article on the Scherl Monorail Gyroscope Car in your issue of January 21, 1910, I beg to quote the following: "There is apparently no provision for the cars being prepared to meet a curve, a detail which would be of greater importance as the speed increased. It is not possible with the single rail to prepare the car for a curve as is the case when two rails are used."

You, no doubt, have in mind single curves only. It would seem that if the curves were spiralled or eased off on the ends, that the car could be prepared to meet the curve, and



Gyroscopic Action on Curves.

that the speed could be increased, and that it would then be possible with the single rail to prepare the car for a curve, as is the case when two rails are used.

As I understand gyroscopic action in the monorail car, all things being equal, on tangents, the resultant of the forces due to gyroscopic action would be vertical and the car would assume a vertical position; on curves, the resultant of the forces due to gyroscopic action would act along the resultant due to the forces of gravity and those of centrifugal motion, and the car would lean toward the center of the curve, this leaning position being controlled by the speed of the car and by the degree of curvature.

Should the gyroscopic monorail car take a curve which

had been spiralled or eased on each end, beginning at zero curvature and gradually increasing the curvature until the full degree of simple curve is reached the following conditions would obtain: The center of gravity would *tend* to move outward with increasing rapidity until the simple curve was reached, the force due to gravity would remain constant, the force due to centrifugal motion would increase from zero to the centrifugal force, as for the simple curve, and the lean of the car would be a gradual process from the perpendicular position obtained on tangents to the leaning position obtained on the simple curve. The leaning position (all things being equal, and by the use of the hydraulic jack, which changes the phase-difference of the two kinds of forces) should be along the line of the changing resultant, and the center of gravity would therefore remain at all times above the point of support.

HERBERT H. CANTWELL,
New York Central & Hudson River Railroad Co.

STEEL RAILS; RELATION OF DESIGN TO STRENGTH.

New York, Feb. 4, 1910.

To the Editor of the Railway Age Gazette:

In a recent paper on "The Evolution of the Metal Tie, or Sleeper," I explained why engineers in the past had adopted iron and steel sections, for engineering purposes, that were not best suited to meet the highest requirements. The reason being that a proper section could not be rolled at that time.

In the early stages of railway construction iron was the metal used for rails and, owing to its weaker nature, when

Fig. 1.

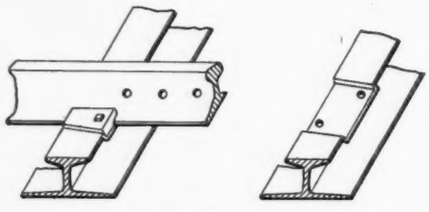


Fig. 2.

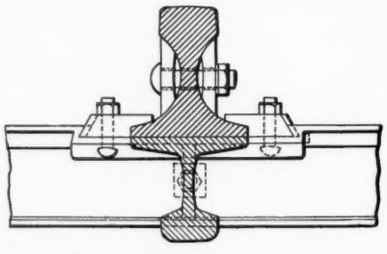


Fig. 3.

either hot or cold, the rails were designed on entirely different lines; that is to say, the flanges were both narrower and thicker. This kind of rail design was made necessary by the supposed impossibility of rolling rails of more modern dimensions. The advent of steel, with its much greater strength, at rolling heat, permitted many changes in rail design, especially in adopting wider and thinner flanges. These changes were chiefly for economizing in weight of rail, by leaving all the metal possible in the head of rail where the direct wear is centered. It may be asserted that these changes have not produced all the advantages expected by the engineers that designed them.

The railway engineer, when designing a rail section, naturally has in mind the various functions that a rail has to perform, also, as far as his knowledge goes, the practicability of rolling the rail itself. The steel manufacturer generally looks at the entire transaction from a commercial standpoint. The consequence is that the railway officers find out, when it is too late, that the rails are not giving the satisfaction expected.

The recent experience of railway officers with broken rails and the consequences entailed thereby, justify a few suggestions toward bettering these conditions.

Rails, as now produced, have to be shaped so that they will provide the necessary angle under the head, to transmit to the angle joint the downward pressure occurring at the end of the rail. The designing of the rail section to meet these conditions results in producing a rail that is inherently weak in structure. In practice it is well known that any angle rolled in a steel bar is a great source of weakness, especially where the section is submitted to shock, as in rail service. Another defect in the present rail design is that in rolling the angle part of the metal it never gets proper rolling action, but is drawn through the rolls at a different surface speed, resulting in permanent stresses left in the rail. The question naturally arises: Can a rail be designed and rolled, having the best physical qualities of steel to meet the requirements called for in modern railway traffic? Yes, if the angles under the head and on top of flange be eliminated, and a suitable joint and rail be substituted for present design.

Within my own experience the function of the joint was to keep the ends of the rails in alinement and the joints were simple bars, fitted to the web without coming in contact with either the head or flange, but as axle loads increased it was found necessary to provide bars that would resist the bending action of the rails. This was secured, in a measure, by widening the fish-plates, so that they would have a bearing against the under side of head and top of flange. This resisted, in a degree, the bending movement of the rail ends, by the vertical stiffness of the angle bars themselves, but it was found that unless the angle in the rail (under the head) was sufficiently acute to transmit the pressure through the bars, the joint bolts had to sustain the load, which was the function of the angle bars. Angle joints have been increased in weight and the design modified until it is stated that they give 100 per cent. efficiency in a joint. If this is true, we have the acme of angle joints and cannot expect further improvement in joints that depend for their application on the weakening of the rail at least one-third of its effective strength.

I have designed a rail (Fig. 1) that, in my opinion, overcomes the objections referred to.

First.—It has much greater resistance to fracture from its design, which gives it the greatest strength and toughness for its weight.

Second.—It is much simpler to roll.

Third.—It will have, from its greater depth of head, the capacity for much longer life in service and freedom from split heads and battered ends.

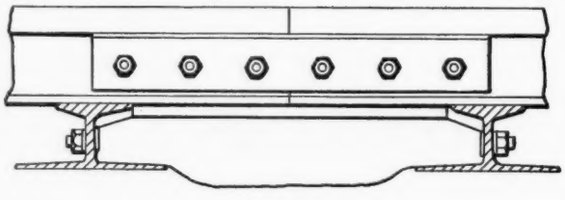


Fig. 4.

Fourth.—Its shape permits more effective rolling action, and thereby greatly improves its physical qualities.

Fifth.—The more uniform mass of metal in the head and flange allows a more equal cooling equation and consequently less cold straightening.

Sixth.—The section can be rolled without leaving in the rail inherent stresses, which is impossible in the usual rail section.

Seventh.—This design neutralizes, to a great extent, the

physical defects inherent to the present methods of making rails.

The adoption of this rail section does not entail any radical changes for its installation. Wooden ties can be used, except at the joint, and the rail can be used in connection with the usual rails, as there is no change from the standard sections in height or width of head.

It is proposed to use two York steel tires, with recessed seat for rail (Fig. 2), an dthereby furnish the most efficient joint yet introduced, that can beadapted to any possible axle load. Its simplicity, strength and adaptability to sustain the load, also its easy method of adjustment, should commend it to those who have had experience with the many failings of the present type of railjoint. Figs. 3 and 4 show the three elements in combination: rail, tie and joint.

JAMES E. YORK.

Contributed Papers.

TRAIN ACCIDENTS IN DECEMBER.[1]

Following is a list of the most notable train accidents that occurred on the railways of the United States in the month of December, 1909. This record is intended to include usually only those accidents which result in fatal injury to a passenger or an employee or which are of special interest to operating officers. It is based on accounts published in local daily newspapers, except in the case of accidents of such magnitude that it seems proper to write to the railway manager for details or for confirmation:

Collisions.

Date.	Road.	Place.	Kind of Accident.	Kind of Train.	No. persons reported Kil'd.	Inj'd.
2.	Ft. W. & D.	Wichita Falls.	bc.	P. & P.	1	5
3.	Tex. & Pac.	Waggaman.	rc.	P. & Ft.	1	1
3.	Louis. & Nash.	Birmingham.	xc.	P. & Ft.	1	5
6.	C., R. I. & Pac.	Caston, Okla.	bc.	P. & Ft.	1	7
6.	N.Y., N.H. & H.	Clinton, Conn.	xc.	P. & Ft.	0	2
†13.	Lk. Sh. & M. S.	North East, Pa.	rc.	P. & P.	3	18
16.	Minn. & St. L.	Perry.	xc.	Ft. & P.	1	0
†16.	A., T. & S. F.	Winona.	rc.	P. & P.	1	18
17.	Cent. Ga., M.&B.	Harris City.	xc.	P. & P.	3	0
17.	C., M. & St. P.	Pingree.	rc.	Ft. & Ft.	1	2
18.	Chic., B. & Q.	Seneca, Neb.	bc.	Ft. & Ft.	2	0
18.	Lk. Sh. & M. S.	Cleveland.	xc.	P. & Ft.	5	12
18.	Ill. Central.	Hawthorne, Ill.	rc.	P. & Ft.	0	10
19.	C., M. & St. P.	Blakeley.	bc.	P. & Ft.	2	0
21.	Lk. Sh. & M. S.	Hillsdale.	bc.	P. & Ft.	1	3
27.	Balt. & O. S.W.	Ft. Ritner, Ind.	bc.	Ft. & Ft.	5	4
†31.	N. Y. C. & H. R.	Croton.	rc.	Ft. & P.	1	2

Derailments.

Date.	Road.	Place.	Cause of derlmt.	Kind of train.	No. persons reported Kil'd.	Inj'd.
3.	P., C., C. & St.L.	Lewisville.	d. switch.	Pass.	0	6
8.	Wabash	Belleville.	unx.	Pass.	1	6
8.	Den. & Rio G.	Blanca.	boiler.	Ft.	1	2
10.	Chic., B. & Q.	Gilson, Ill.	b. rail.	Ft.	3	0
10.	Chic., B. & Q.	Exeter, Neb.	unx.	Pass.	0	8
†12.	Chic. & N. W.	Chicago.	d. track.	Pass.	2	4
13.	N. Y. C. & H. R.	Yonkers.	landslide.	Ft.	1	1
†15.	Southern	Greensboro.	b. rail.	Pass.	9	2
15.	C., M. & St. P.	Bayard, Ia.	unx.	Pass.	0	12
18.	Great Northern.	Monticello.	d. rail.	Pass.	1	..
18.	Chic., B. & Q.	Western Spgs.	d. rail.	Pass.	0	12
19.	South. Pac.	Benson.	unx.	Pass.	2	13
20.	Penn.	Massillon.	acc. obst.	Pass.	1	3
20.	Central Ga.	Weems, Ala.	unx.	Pass.	0	3
*22.	C., M. & St. P.	Good Thunder.	d. track.	Pass.	0	40
27.	Southern Pac.	Halley.	b. rail.	Pass.	0	2
31.	C., C., C. & St.L.	Dawn.	malice.	Pass.	0	2
†31.	C., R. I. & P.	Trenton, Mo.	unx.	Pass.	3	43

The collision at Clinton, Conn., Monday, December 6, occurred about 4 o'clock in the morning. A westbound passenger train ran past a stop signal and into the side of a freight train which was backing across to the opposite main track. Five freight cars were wrecked. One passenger and the fireman were slightly injured. The engineman of the passenger train admits that he was asleep. The newspapers printed, with variations, a statement that he had been on duty, or, at any rate, had been without sleep, 48 hours, and had expressed unwillingness to begin this trip. One statement said that he had had only a very few hours' sleep in the past 58 hours. An officer of the road, however, says that the engineman was off duty on Sunday from 4:50 a.m to 4:55 p.m. At 4:55 p.m. he began his run from New Haven to Boston, completing the journey at 8:40 p.m.; then, after three hours 20 minutes, he began the return journey at midnight from Boston to New Haven, and the collision occurred at 4 o'clock Monday morning.

The rear collision of passenger trains at Northeast, Pa., about 1 o'clock on the morning of the 15th resulted in the death of three passengers. The leading train was at a standstill, having been delayed by trains ahead, and these three passengers were in the rear car of that train. Seven passengers were seriously injured. The second train, which was one of the fastest on the road, had passed a distant and a home automatic block signal set against it. Besides this the flagman of the standing train was back a considerable distance. The air was filled with snow.

The collision at Cleveland, Ohio, on the morning of the 18th, about 2 o'clock, was between westbound passenger train No. 1 and a switching engine. Both enginemen, one fireman and two members of the switching crew were killed, and ten passengers were slightly injured. The switching engine was crossing the main track diagonally; the passenger engine was overturned.

The collision at Hawthorne, Ill., on the 18th, about 6 p.m., was due to the absence of the rear brakeman from the freight train. This train entered a siding at Hawthorne to make way for the passenger train which was following it; but the rear brakeman, who should have set the switch straight for the main track, after his train had cleared it, had fallen from or been thrown from, the steps of the caboose, two miles back. He was not so severely injured but that he got up and tried to stop the passenger train, when it came along, by swinging his lantern, but the light was blown out by the wind, and so the passenger train ran over the misplaced switch and into the rear of the train. The engineman of the passenger train saw the switch about 300 ft. before he reached it, but was unable to bring his train to a stop. He jumped off and was painfully injured.

The butting collision near Fort Ritner, on the 27th, was between heavy freight trains moving at good speed. The trains met on a sharp curve and both engines and many cars were wrecked. One engineman, both firemen and two brakemen were killed, and four trainmen were injured, suffering severely from cold before relief arrived. The men in charge of the westbound train were running on a time order and overlooked the time at Fort Ritner.

In the rear collision at Croton, N. Y., on the 31st, a southbound special freight train of 13 cars ran into a preceding passenger train (No. 62, second section), which had been stopped, but had just got started again, and the rear car of the passenger train was wrecked for over half its length. One passenger in that car was killed and two porters were injured. The car was pushed violently forward and badly damaged the one ahead of it. The line of the road at this point is straight for about 2,000 ft. back from the point of collision. The passenger train had been stopped by the advance block signal at Croton, because of a train in the block ahead, and had been standing about four minutes, with its rear end twelve feet ahead of the home signal. This home signal was set against the freight, as was the first automatic signal north of this, which is 3,843 ft. away. The home signal was worked by the signalman, but north from Croton the signals are automatic, installed about November 1, in place of the controlled manual signals heretofore used. The new signals are three-position, upper quadrant. The rear of the passenger

[1] Abbreviations and marks used in Accident List:
rc, Rear collision——bc, Butting collision——xc, other collisions——b, Broken——d, Defective——unf, Unforeseen obstruction——unx, unexplained——derail, open derailing switch——ms, Misplaced switch——acc. obst., Accidental obstruction——malice, Malicious obstruction of track, etc.——boiler, Explosion of boiler of locomotive on road——fire, Cars burned while running——P. or Pass., Passenger train——F. or Ft., Freight train (includes empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

train, as well as the home signal, could be seen by the engineman for the whole 2,000 ft. of the straight line. The flagman had gone back a distance of about 200 ft.

It is believed that the immediate cause of the collision was the mistake of the engineman in misreading the distant signal (the automatic signal) or in assuming that it indicated clear when it actually indicated caution.

In the investigation of this accident by the New York State Public Service Commission this engineman, Eugene Flanagan, said that the distant signal indicated clear and that he was running at only about 30 miles an hour as he passed it; and that he applied the brakes 1,700 ft. from the passenger train so as to make an emergency application; and that at the moment of collision his engine was running about six miles an hour.

Flanagan said that he had been a freight engineman two years, and before that a fireman, all on this division. He had had 21 hours rest before beginning this trip. This was his first trip running such a light train at such high speed. Asked as to what speed was prescribed he had an impression that 30 miles an hour was about the proper rate for a fast freight. The only instruction he had as to speed on beginning this journey was that it was a "silk train"; that is, a train containing cars loaded with silk from the Pacific coast, which freight seems always to be rushed through at the highest speed. Having no special instructions on starting he did not run fast enough to suit the despatcher, who sent him the following telegram, signed by the superintendent:

> Engineer 2153: "You have made a very poor run with the train you have, considering its size and importance. What has been the cause of this poor time? Want you to try and do better, as your train is wanted in New York just as soon as possible. Second 62 is right behind you."

This was delivered to Flanagan two or three hours before he reached Croton and while he was still ahead of the passenger train which afterwards passed him. Questioned as to his standing at the time he was examined for promotion from fireman to engineman he said that in the mechanical management of his engine, in the management of air brakes and on the questions relating to running compound locomotives, he received percentages varying from 85 to 96, but as to train rules no percentages were mentioned; he thought he had missed one or two questions.

The despatcher who sent the message calling for higher speed testified that he sent such message whenever he thought necessary; might find occasion to send such a message every night.

Following are additional details of the testimony given before the Public Service Commission:

W. H. Elliott, signal engineer, presented a sketch of the situation at Croton. The passenger train stopped at or near the signal cabin (Tower 32). Stop signal No. 19 was 12 ft. back of the rear of the train. The next signal in the rear, No. 35.21, is 3,843 ft. back, and this signal (35.21) is visible from a southbound train 750 ft. farther back. From signal 35.21 back to signal 35.91 the distance is 3,547 ft. The water trough, between the rails of the track, is between signals 19 and 35.21. It is 1,412 ft. long. A southbound train, after passing signal 35.21 about 1,500 ft. comes to the beginning of the water trough, and at about the same point signal 19 comes into view. Signal 18, some distance south of the standing passenger train, is the starting signal. Signals 18 and 19, as well as the new automatic signals to the north, are all power operated and semi-automatic. The signalman cannot clear any of these wrongfully, as they are controlled by the track circuits. By throwing lever 5 to clear the dwarf signal for reverse movement the signalman would change signal 35.21 to the stop position. Mr. Elliott concluded that the last named signal was in either the caution or the stop position against the silk train, because it was observed to be in the caution position when the passenger train was approaching. Signal 35.21 is 842 ft. farther north than the former distant signal, used there before the automatic system was installed.

J. K. Bellew, signalman, thought the passenger train had been standing about five minutes when the collision occurred. As the engineman reversed his engine to take the slack, Bellew cleared a dwarf signal (lever No. 5) which is provided for reverse movements, for the purpose of setting in the stop position the automatic signal 3,843 ft. in the rear, this signal being controlled by a circuit breaker connected with lever No. 5. He did this as a general precaution, not because he saw or heard the freight approaching. Having done this his indicator in the cabin showed that the signal, which was No. 35.21, was in the caution or the stop position.

L. D. Killmer, conductor of the passenger train, testified that in the baggage car of his train the shock of the collision was not severe; so light in fact that he was astonished when he saw the wreck of the rear car. Asked about the flagging rules, he said that in former years, when he was flagging, it was the rule to "go back till we met something." Asked about the present rule, and as to what was the meaning of the term "a sufficient distance," he replied: "Well, I have thought that over a good deal myself; I can't say as I could answer that." Asked about the present practice, and replying especially with reference to southbound trains in the morning, when suburban passenger trains are frequent, the witness said that trains were stopped so frequently at the block stations that flagmen did not go back much; that is to say, his train was not called upon to stop to pick up flagmen of preceding trains.

Eugene Flanagan, engineman of the freight, has been a freight engineman two years, and before that a fireman seven years, all on the Hudson division. He thought the temperature on the morning of the collision was below zero. Signal 35.21 was clear as he approached it; "right up in the air, 90 degrees."

Q. How far away were you when you saw signal 19?

A. Probably 1,400 or 1,500 ft.

Q. How fast were you going?

A. About 30 miles an hour. Reversed the engine when about 500 ft. from the passenger train and struck that train at about six miles an hour. Flanagan said that on seeing signal 19 against him he made an emergency application of the brakes. Questioned as to whether he did not make a partial application, allowing the catch to stop in the notches, he said that he did not. He pulled the handle right around, the full stroke. Asked why he reversed his engine when the rule required that he should not reverse when the driver brakes were set, he said that he thought there was a chance that that would hasten the stop, and that it was his duty to take the chance.

Fireman Knapp, of the freight train, eight years a fireman, was first aware of danger by seeing the flagman violently waving his flag. Knapp stayed on his engine and "really did not think that it would strike" the train ahead. He had not seen any signals from Crugers until he came to 35.21 on account of the frost on his windows. He had the windows shut because he was sweating. At signal 35.21 he had to open his window to locate the water trough, and then he saw the signal. It indicated clear. He did not call it out to the engineman, as the engineman himself was looking out.

Mr. Benson, mechanical superintendent of the Pullman Company, testified as to the construction of the sleeping car which was wrecked. This car was built at Buffalo in 1893, and the siding was last taken off in November, 1905. It had no steel sills, but was stiffened with steel plates at the ends. The outside sills were 5 in. or 5½ in. x 8 in., stiffened at the ends for about 18 ft. with ½-in. iron plates. Practically all Pullman cars are built on the same plan as this one. Steel underframes are being considered, but have not yet been put in use.

Conductor Shufelt of the silk train thought his speed was not over 30 or 31 miles an hour anywhere from Albany to Croton. The speed was not increased after passing over the

water trough. He did not feel any emergency application of the brakes.

The train derailed at Western Springs, Ill., on the morning of the 18th, about 4 o'clock, was the Oriental Limited Express, eastbound, No. 52, and the three rear cars, two of them sleeping cars, were overturned and dragged along the ditch, but they were not much damaged, though the train was running about 50 miles an hour. The newspaper accounts say that some of the passengers in the sleeping cars had stuffed clothing around the windows to protect themselves from the cold, and that these improvised cushions mitigated the injuries which they suffered from the shock of the derailment. The cause of the accident was a broken rail, and the rail was found to be piped. The outdoor temperature at the time of the accident was about zero. Nineteen passengers and three employees were injured, few of the injuries being serious.

The derailment at Benson, Ariz., at 4 o'clock on the morning of the 19th, was due to excessive speed on a curve of 10 deg. The engineman and fireman were killed, and six employees and 49 passengers were injured. This train was the "Golden State Limited," eastbound, which is run in connection with the Chicago, Rock Island & Pacific. The engine and first four cars jumped the track about 200 feet after entering the curve and cleared the rails entirely, allowing the remaining four cars of the train to continue along the track without hindrance. These cars ran about 700 feet before they were stopped by the automatic action of the air brakes. This circumstance, and the momentum with which the engine and leading cars evidently were driven along the ground after leaving the track, were taken by the investigators as conclusive evidence that the train was running at very high speed. The elevation of the outer rail of the curve was 4½ in., and according to the rule the speed at this point should have been limited to 25 miles an hour. The track was found in good condition after the derailment. Nothing wrong was found in or about the wheels of the engine or the tender. The rails of the track were not damaged, except that one rail was kinked. The ties and the signal bond wires were all found unbroken. The engineman was one of long experience on this line.

The derailment at Trenton, Mo., on the 31st occurred while the train was running at high speed, and the first vehicle to leave the track was the tender. Two passengers and the fireman were killed, and nine employees, 27 passengers and five other persons were injured. The wreck took fire very soon after the derailment and was mostly burnt up.

Of the 13 accidents to electric cars, of which we have found accounts in the newspapers in the month of December, four are reported as causing fatal injuries, the total number of persons killed or fatally injured being nine. One runaway is attributed to the sudden death of the motorman from heart disease. In one collision the superintendent of the company was acting as motorman and he himself was killed. One derailment, killing two passengers, was caused by running at full speed around a sharp curve, and the reports say that the motorman was new at the business.

THE DIVISION SUPERINTENDENT'S OFFICE AND THE SUPERINTENDENCY.

BY C. A. CANDEE,

Former Chief Clerk in Division Superintendent's Office, Philadelphia & Reading Railway.

In every department of railroading there are employees upon upon whose shoulders, as they think, rest the burden of that department. It is needless to argue that this idea does not prevail among chief clerks in the operating department, for if the *Railway Age Gazette* has not said as much in actual words, it has at some time or other solemnly intimated that the belief is prevalent. For the time being I shall try to stifle that idea and let my thoughts flow from an unbiased mind.

In the early days before the event of the typewriter, when it was thought unnecessary to keep extensive records of employees as to promotions, seniority rights, discipline, etc,; when methods of accounting were in the initial stage, office management was a less complex problem than in these days of minute detail in every branch of the service, when federal and state supervision prevails, and when the gross earnings of our important iron thoroughfares run from the fifty million to the one hundred and fifty million mark.

The perfection of the typewriting machine, while it has rendered great service to mankind in simplifying and making possible the accomplishment of important work, has seriously complicated matters in other respects. There are many prolific writers among railway officers, some of whom would make even our greatest message-writing president look to his laurels. It has been said of one general manager in particular that every time he passed a telegraph pole while out on the road in his private car, a heavy cloud of disappointment would spread over his features if he could not find some excuse to frame a telegram. It is generally conceded that a very large proportion of letter-writing is unnecessary. In some offices it is altogether probable that if proper records were maintained and referred to when information is required, the services of at least one stenographer might be dispensed with. Such a procedure would, however, be highly unsatisfactory to many, for does not a large staff of clerks denote a huge business! And who does not like to feel that the correspondence and business of his department is heavier than that of any other! Volume instead of merit is too often the slogan.

STATION AGENTS' REPORTS.

If one is determined to reduce correspondence, it can be done. A few years ago our agents were required to submit weekly letters giving a summary of the work done at their respective stations. It was soon found that the superintendent gave little heed to the statements that the farmers had begun cutting their oats, or that a carload of grain had been received for John Smith. Figures showing the business handled were useless, as there was no comparison, and if there had been weekly comparisons at the major portion of stations would prove of little or no benefit. After a time these reports were discontinued and a monthly statement substituted giving information of this order:

Carload freight:
- Cars received
- Tons received
- Cars forwarded
- Tons forwarded

Package freight:
- Tons received
- Tons forwarded

Coal:
- Tons received
- Cars received.

Revenue:
- Anthracite coal
- Bituminous coal.
- Merchandise forwarded.
- Merchandise received
- Tickets.
- Telegraph
- Car service
- Miscellaneous.

Pieces Baggage handled:
- Outbound
- Inbound

No. Waybills issued:
- Local
- Joint
- Company

No. Tickets sold:
- Milk
- Local
- Foreign
- Excursion
- Commutation

No. Messages handled:
- Company forwarded
- Others forwarded
- Company received
- Others received

The contents of these monthly sheets are tabulated in a book which gives a complete story of each agency for the past six years. These figures are especially helpful in measuring the work of a station, or when additional assistance is wanted at any one point, instead of depending upon delusive theories as to why it should be forthcoming, the superintendent refers to the book, and if the request is unwarranted, as can usually be told at a glance, he so informs the agent and gives the reason therefore. This alone has considerably reduced the incoming mail and affected a large saving in stationery.

Another method of reducing to the minimum unnecessary letters pertaining to that all important subject, the delay of cars at stations, is by requiring agents to submit to the division office tissue or carbon copies of the daily car reports they forward to the car record department. While it is, of course, a duty of train despatchers to keep cars moving, the receipt of these reports by the superintendent gives an additional impetus to the work, and he is at all times in position to know if quick car movement signifies as much to all concerned as it should.

These reports show the number and initial of all cars, date of arrival and release, and the cause of any unusual delay. The information obtained is so very complete that only a comparatively few cases really demand investigation.

THE FILES.

It is truly wonderful what an hypnotic influence the single word "file" has in a railway office. It is probably the most used word in the railroaders' lexicon, for it is file this and file that from morning to night until scarcely a paper enters an office which does not eventually find its way to the file clerk's desk. Adopted with a view of making office work practical, it too frequently brings dire confusion. There are many subjects which no two men will file alike, and which no man will file alike on two successive days. Hence, simple little words that it is, apparently incapable of provoking any man's wrath, it has, nevertheless, much to answer for in the reckless use of language it frequently incites.

One reason which has led to the indiscriminate filing of a vast mass of papers is not so much the difficulty of separating the chaff from the wheat, but the assumed necessity of recording every telegram, every letter and every document received by the office that in the event of their being called for they may be produced. Whether or not the papers are found when required depends on the system used in filing and the fitness of the file clerk for his work. A first-class file clerk must like details; he must have patience to wade through large batches of papers and seek for other subjects than the one which first greets his eye. Trouble frequently follows because a clerk lacks this patience. Often there are two or more subjects covered by one file—a trap which correspondents unwarily and sometimes unavoidably lay. To cross index a file under every possible subject it may cover is the only remedy that brings real peace of mind to the file clerk. A file clerk must also have ingenuity to invent schemes by which he can by proper records relieve himself of responsibility for loss of files that when loaned are not returned, although it may in some cases be policy for him to accept the blame without remonstrating.

We have known of instances where files have been put away most painstakingly, the bundles even being decorated with pink ribbon. In the course of time they were transferred to the storage room to make space for new arrivals. Later, when the call came for certain papers among those stored, the clerk from indifference or haste, would leave those he did not want loose on the shelf. Other clerks (having access to the files) in search of papers in the storage room would not feel called upon to remedy someone else's negligence by tying up and replacing the papers; instead, if the loose papers hindered their progress, the whole lot would be deliberately thrown on the floor. It is to be hoped that such cases are rare; but it is generally feared that considerable indifference characterizes the work in filing departments which brings much deserved reproach upon filing methods.

Undoubtedly, the best method of filing that has come to the attention of the writer is the decimal classification system, copyrighted by W. H. Williams. Some there are who think it a failure, but I have not been well impressed with their treatment of it. We have tried several schemes and closely observed the workings of others; but thus far are convinced that the decimal system above referred to, intelligently applied to the requirements of each particular office and used in conjunction with the vertical filing cabinet, excels any other in vogue. One of its best features is the ideal classification of subjects; another is that files can be revised time and again as the correspondence grows—a little here, a little there; papers of real value can always be kept at hand, while those of doubtful value can be assigned to the storage room. Ready reference files do not become burdensome, and it is as easy to get the first batch of papers filed at the last.

AGREEMENTS.

The matter of filing agreements is of great importance. There are probably few offices which do not follow the traditional method of folding each agreement and writing the subject matter on its back—an excellent practice, perhaps, where original agreements are kept. In this office no original agreements are filed, but typewritten copies are made of all such as pass through it, and these with blue-print plans are placed in loose leaf books. Where sidings are laid without agreement, of if any transfer of property is made where the deed or agreement does not come to this office, copies of all correspondence pertaining thereto are placed in the agreement book, thus giving in concise form a parmanent record of such transactions. A decimal index is used which makes it feasible to classify together agreements entered into with any one party, as well as those bearing upon certain districts. These volumes are kept on the writer's desk, so that he has instant access to any one of the several hundred agreements in the office. Such a scheme makes it practically impossible to lose or misplace important documents, and, what is also essential, curtails clerical work.

The agreement books, together with plue-print plans and physical characteristics of the division, enable the office to decide many questions without consultation with other departments, another means of materially reducing correspondence and telegrams.

EMPLOYEES' SERVICE RECORDS.

Service records of employees are kept on cards, as shown in Fig. 1. On the tab figures are inserted to indicate the year in which each employee is eligible for the pension list. To pick out annually those who are to be pensioned would be an onerous task without the aid of such a scheme. Its application is simple in the extreme. For instance, all 1909 men are shown by table in one vertical column bearing the numerals '09. The 1910 men follow in the next parallel row, and so on. Space in the vertical filing cabinet is assigned to papers pertaining to men, each employee being given a folder. When a man leaves the service his card is placed with the ex-employees' cards and his folder transferred to the storage file for records. If he re-enters the service his card and folder are placed in the

09

NAME Doe, Robert — Entered Service as Brakeman — File 901

Born Nov 29, '39 — Married Yes

Employed as	Location	From	To	Date	Discipline	Remarks
Brakeman	N+S	1-10-94	5-17-61	6-4-00	Suspended	30 Days fc Collision Eng. 1070 + 946 at Jamestown 6-8-00 acc File 1041
Flagman	"	5-18-61	8-3-64			
Freight Condr.	"	8-4-64	4-10-73			
Passgr. "	"	4-17-73				

Examined on	Remarks	Date
S.H.+C.S.	Approved	9-14-04
Book of Rules	"	3-20-05
"	"	1-9-06
S.H.+C.S.	"	10-18-06
Air Brake	"	11-7-04
S.H.+C.S.	"	4-8-06
"	"	9-5-06

Fig. 1.

"live" file. Thus we have in compact form a continuous and complete record of every employee. In addition a roster is maintained on bulletin boards showing the seniority of men in the train service. This leaves no loophole for anyone to claim another out, as yard, road, passenger and freight men are classified by themselves, so they know at all times just where they stand.

Agents and operators are not overlooked as regards their standing with the company, their seniority in service being also a matter of record. But in making promotions one's ability to assume charge of important agencies must always be demonstrated.

A card record is also maintained of all members of the relief association as shown in Fig. 2. This record a few years past was kept in book form. The chief objection to the book was

that owing to the association's constantly changing membership it was always in deplorable condition and had to be rewritten at least every year or two. Its mixed condition was always a source of irritation, as the attempt to show the names in accordance with their location on the payrolls proved impossible. Since the introduction of the cards this trouble is obviated. Now, if a man is transferred from one district to another, his card is changed accordingly, which greatly facilitates the pasting or deductions on the payrolls. No effort is made to keep the cards alphabetically arranged, for the tabs (containing the first two letters of the surname) are sufficient guides to find any desired card.

called to account for the infraction of at least one set of instructions.

LOSS AND DAMAGE CLAIMS.

The tremendous loss railways sustain from claims is occasionally made public. It is pointed out by freight claim agents that a large proportion of such loss is the result of carelessness and indifference on the part of employees. This office recognizing this condition has set itself the task of assisting the claim department to reduce losses from this source by requiring agents to submit to it copies of all damage reports. These damage reports are carefully scrutinized, especially the seal records and the general nature of the damage sustained.

Name [redacted] Doe, Robert Occupation Conductor

Class	A. D. B.	Date Application in Effect	Age	CERTIFICATE OF MEMBERSHIP Delivered	To Whom	Number	MEMBERSHIP CEASED Date	Cause
1		12-1-88	49	12-10-88	R D	370		

YEAR	DEC.	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	REMARKS
1907	75	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
1908	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
1909	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
19													
19													
19													

DISABLEMENT RECORD.

FORM 14 R. A. Number	Date	First Day no Time	Issued by	FORM 36 or 28 R. A. Acc. or Sick	To Sup't R. A.	Able to Return to Duty	Returned	FORM 39 R. A. BENEFICIAL From	To	Amount	To Sup't R. A.	BENEFIT CERTIFICATE Date	Number	REMARKS
15979	3/8/09	3/8	F H H	5	4	4/1/09	4/7	3/15	3/31	6 80	4/1	4/7	B 7092	
								4/1	4/16	2 40	4/8			

Fig. 2.

Records are kept in book form showing the cost of lights, water, telephones, etc., at various stations; the cost of maintenance of crossings and interlocking plants at junction points, etc.; of books of rules, switch keys, watches and uniforms furnished employees.

STATION AGENTS' INSTRUCTIONS.

It is altogether probable that agents have been more severely taxed mentally than any other employee. They receive all sorts of instructions from accounting, freight, passenger, baggage and car record departments, division superintendents, and possibly a half-dozen other sources. As a general proposition, there is little or no method of governing the issuance of these instructions, although since the Interstate Commerce Commission has become a power in the railway world system is being introduced, particularly as regards tariffs. If men who have grown gray in the service become bewildered now and then by the never-ceasing output of instructions, it would be little short of the marvelous if the younger generation were able to familiarize themselves with all the rules and regulations. Every superintendent's office should realize this fact and endeavor to make instructions emanating from it as lucid and brief as possible. One way that comes to mind (while simple, it acts as an illustration) is in issuing embargo notices. Embargoes are constantly being placed and canceled. But there are always some which remain in force indefinitely, some as long as two or three years. For this reason an embargo notice is issued at least once each month, containing in concise form all embargoes in existence. Agents acknowledge their receipt by endorsing and returning to the superintendent the preceding notice, thus making confusion impossible. All embargoes placed meanwhile are issued in supplemental form. This relieves agents of any excuse for overlooking an embargo and at the same time frees his mind of the fear of being

If they plainly indicate that the damage was caused by ill usage of employees who handle the shipments, the cases are investigated. When negligence is apparent on other divisions the reports are forwarded to the superintendents of those divisions for such steps as they wish to take. It is interesting to note the effect of this action. At certain transfer houses agents have stated that the continual receipt of these reports has led them to pay particular attention to shipments destined to our territory. The decreased number of complaints received warrant the belief that their statements are true, as well as demonstrates the fact that division employees are beginning to exercise better judgment in handling freight.

THE CHIEF CLERKSHIP.

In the selection of a chief clerk it is obvious that the superintendent must look for the *persona grata* qualification first. After this discreetness, dignity and diplomacy. If a chief clerk drops no injudicious hints out of school; if he makes a good impression upon patrons of the road who enter the office for business reasons, and favorably impresses employees with whom he may come in contact; if he is resourceful and refuses to recognize the fact that there is such a thing as defeat, he gains the confidence and good will of his superiors.

In office management he should be the ruling spirit. He must have executive ability, enthusiasm, clearness of vision and patience in explaining details of work. An infallible memory is a valuable possession, but the chief clerk who is unfortunate in this respect may have recourse to helpful devices. The writer has a loose leaf reference book in which he keeps copies of all important notices, letters of instruction from various departments, etc. The rapidity with which these special instructions accumulate may be partly understood, when it is stated that this book now contains in the neighborhood of 500 pages, many of which bear a half-dozen

or more items. The indexing is simplified by using the decimal system in vogue in filing the general correspondence.

It is needless to say that while a chief clerk may not thoroughly know all the rules and instructions in force, it is essential that his knowledge of them should be sufficiently extensive to enable him to handle a large variety of questions. To this end he must have at hand the book of rules, the powder and inflammable rules, freight and passenger department rules, car service and accounting rules. As regards the last named, since the Interstate Commerce Commission has decreed that roads must conform to certain methods of accounting, the various accounting books issued by the commission with which division offices must be familiar, number about 450 pages.

It is the duty of the chief clerk to know that credit is given for service performed; that bills are carefully checked to prevent improper charges being made against the division. It is his duty to know that all junction points, sidings and crossovers are properly covered by agreements or documents, that his road may not be unduly charged with their maintenance, and that other roads and individuals may be billed for all work performed which is rightfully chargeable to them. (In one city alone on this division there are 25 crossings with other roads, which indicates in a measure the magnitude of the problem.)

Copies of special train arrangements are made for the chief clerk and retained on his desk in date order, so that each day he knows just what extra trains are running. A copy of all forms covering the employment of temporary help is also made for him that he may see that the services of such men are terminated when the time limit expires. He keeps, moreover, a copy of the bridge engineer's annual report and checks off bridges which are reported from time to time as having been repaired in accordance with the requirements, that in case questions arise as to the condition of structures he may be in position to give the facts.

THE SUPERINTENDENT.

As "the dwarf sees farther than the giant, when he has the giant's shoulders to mount on," it is not a difficult thing for a chief clerk to discern the true and the false steps a superintendent may make, but it is not to be denied that the "dwarf's" mind may be sadly out of tune with the times and his view thereby perverted.

Close observation of various superintendents whom I have met leads to the belief that the man of executive initiative wins in the long run. The true executive, if he cannot always select the best men to assist him, develops the talent at his command, or wisely weeds out the disturbing, unreliable factors and promotes men who will strengthen his organization. He may safely lack knowledge of technicalities if his judgment does not betray him in the choice of subordinates.

An official lacking executive ability demoralizes his organization by want of faith in his fellow-creatures, and misplaces his confidence by putting it in men, who though good "bluffers," offer naught but a crop of caterpillars when harvest time comes. He is inclined to be set in opinions which are not infrequently wrong. If he be a specialist his head may contain vast knowledge; he may know intimately the construction of a locomotive; he may be able to figure down to a fraction the tractive power of that locomotive; he may know how to build a bridge or surmount difficult engineering feats, but the mere capacity to accomplish these things is without efficacy unless a superintendent has the natural appitude to apply to his knowledge a very considerable degree of common sense in his dealings with employees.

Officers addicted to profane and boisterous language are rapidly becoming a memory of bygone days.

Criticism is universal, and good, honest criticism is beneficial. The man who knows not how to receive it was not born to command; neither is he a good leader who can see only the flaws in one's work. It frequently happens, though, that the undiscerning critic comes into power. Such a man may drive men by the lash of his sarcastic weapons, but he stifles enthusiasm, without which first-class work cannot be accomplished; he is apt to instill hatred and the desire for revenge into hearts which otherwise would have been true to the core. Organizations thus built are a serious drain on the corporation's pocketbook.

A forceful yet calm and fair attitude should always be maintained in one's relation towards a body of men. There are innumerable ways that men have of pleading their cases. Great pressure is sometimes brought to bear to restore dismissed men, and it is creditable to officers that they can often resist the intense pleadings of not only the men themselves, but of wives, and, in days now happily passing, of politicians. A man disciplined for good cause is in very much the same predicament as a visitor to a session of a supreme court. Venturing in to the wrong room he was politely but firmly requested to withdraw. Failing to gain the coveted honor of remaining with the learned judges, he remonstrated at the door.

"Sir," admonished the aged negro who had been doorkeeper for years, "think it over. Don't do no persiflagin' 'bout that co't. If you get in contempt of 'em you ain't got nobody to appeal to but the Almighty."

There are men in authority who, it is true, make hasty and consequently ill-judged decisions; but I believe the majority of railway officers endeavor to give cases brought before them the fairest and most impartial consideration.

THE LINE OF PROMOTION.

The line of promotion is a much-mooted question. Each department has many good arguments why it is the logical training-ground for the superintendency. If a debate were to decide the question once for all it is quite apparent that the chief clerks would gain the laurels. For, if men of equal ability could be chosen, one to be appointed trainmaster, another chief train despatcher, another division engineer, a fourth road foreman of engines, while still another chief clerk, it is reasonable to suppose that the man in the superintendent's office, through whose hands pass every conceivable question, and who stands close to the department head, would naturally acquire such an intimate knowledge of the direction of all affairs on the division as would enable him easily to outdistance his friends in the sub-departments, who, by reason of their specialized work, can only come in contact with a small proportion of the division business, and that alone which pertains to their particular work. But in the nature of things this assumed case never exists, and the writer does not for a moment entertain the idea that promotions should be made exclusively through the clerical department. Neither can they be safely assigned to any other single department. Some chief clerks have been advanced and merited well the promotion; others have made sad failures. So division engineers, motive power men and trainmasters have mounted the ladder, many to fall ignobly and others to gain greater heights. It would be manifestly out of the question to debar any one department because it had furnished incompetents for exalted positions. If such a scheme were attempted rails would soon rust and roadbeds become grass-covered mounds. The fit only should rule. How to try men out is probably the greatest problem the appointive power has to meet. Whether or not the Harriman Lines are on the right track remains to be seen, but the idea looks reasonable. The opportunity will at least be offered the man of merit to achieve; greatness will not be thrust upon anyone uness perchance some keen mind perceives that there lies dormant within a subordinate—a power that needs only to be awakened to make of him a great executive.

Men in the clerical department, like those in other departments, are not all born to govern large bodies of men. They have a niche which, if filled to the best of their ability, may be their highest duty. It would be folly to rob a department of a first-class clerk to make of him a poor trainmaster or superintendent. If, however, men in the clerical department could feel that their work was observed and their talents measured by the higher officials, it would be some compensation for the loss of greater rewards.

THE NEW PANAMA RAILROAD.*

BY R. F. HOFFMARK.

The old Panama Railroad now in operation was built as a single track road in 1850-1855 at a cost of about $160,000 per mile. This has since been double-tracked for almost its entire length to facilitate the movement of spoil or dirt trains carrying canal excavation to dumping grounds, and to accommodate the increased traffic due to canal work. The old location with the exception of a few minor changes and cut-offs has been adhered to. This location rises from the Atlantic on the natural slope of the Chagres river valley to the summit at Rio Grande, 263 ft. above mean sea level. From this point it descends to the Pacific on the natural slope of the Rio Grande valley.

With the adoption of the minority report for an 85-ft. summit level lock canal came the necessity of an entirely new Panama Railroad. The dam at Gatun, only seven miles from the Atlantic, will convert the Chagres river valley into Lake Gatun, the borders of this lake following the 85-ft. contour. Thus the present line will be under water from Gatun to Bas Obispo, 25 miles. At Bas Obispo the roadbed reaches an elevation of over 85 ft. above mean sea level, but from this point to Paraiso, 8.7 miles, the line is on the west side of the canal. As both terminals, Colon and Panama, are on the east side, and a crossing of the canal is impracticable, this stretch, although above the water level of the lake, is of no value to the re-located line. From Paraiso to Miraflores, four miles, the greater part of the operated line is again below the 85-ft. level. For these reasons it was necessary to re-locate the line with a minimum elevation of 90 ft. above mean sea level from Gatun to Miraflores.

The re-location work had to conform to the following requirements: (1) The location for its entire length to be on the east side of the canal. (2) Sub-grade in no place to be lower than 92 ft. above mean sea level, 7 ft. above the water level of Lake Gatun. (3) The location to be, for construction purposes, as near the operated line as possible. (4) The maximum curve to be 16 deg. (5) The engineers to endeavor by locating long, deep embankments, to supply dumping grounds for excavation from canal.

Since an almost unlimited amount of material for embankments was available, it was decided to have a level grade from Gatun to Bas Obispo. From Bas Obispo to Pedro Miguel, 9.53 miles, it was decided to put the road on the east berm of the canal, sub-grade at 95.00, ten ft. above the water level of the canal, and for this stretch canal excavation and roadbed building will be one operation. Bas Obispo is the dividing point between Lake Gatun and the Culebra cut.

On the Pacific side it was decided to use the same entrance into Panama City, the re-located line joining the operated line near Corozal, 2.5 miles from the terminal. The Atlantic end of the operated line was available from Colon to Mindi, 4.72 miles.

These lines are shown on the accompanying maps.

Preliminary locations were begun in October, 1906, and were completed the following May. Two parties were in the field, one locating the Atlantic and Pacific connections with the operated line, and the other locating from Bas Obispo north toward Colon. The engineers were fortunate in having accurate and fairly complete topographical maps of the Chagres river valley, basin of Lake Gatun and a 100-ft. contour sketch map of the Chagres river and its tributaries. Even with the help of maps, however, locating in the tropics is quite a different proposition from the same work in more northern countries.

In the canal zone there is almost no land under cultivation, there are no roads, no open prairies, nothing but mountainous, broken country covered with a dense, tangled jungle. Reconnoissance is impossible, Panama having but few wretched trails, over-grown with creepers, brush and palm trees. Very little knowledge can be gained of the topography of the country by walking over likely locations by these trails. The system used on the Panama Railroad work was to project a preliminary line on the maps at hand and then "plug" it through. In un-mapped stretches of country a flying transit and level party was used to run a 92-ft. elevation line. Exploration lines were thrown out in places where high ridges or low flats were encountered. The borders of Lake Gatun on one side and the prohibitive distance of wide detours on the other, limited the location of the line to a comparatively narrow stretch of country, so rapid progress was made with the system used.

Just south of Gatun the line struck the Gatuncillo river valley, 8 to 10 ft. above mean sea level, soft, swampy and over 1¼ miles wide from support to support. To cross this would require an embankment 84 ft. high, which, upon the closing of the Gatun spillway, would be through an arm of Lake Gatun, 1¼ miles wide. Although an embankment of this nature, assuming a 40-ft. top width and two to one slopes, requires 4,250,000 cu. yds. of material, the yardage was not considered prohibitive. The flat, marshy nature of the bottoms, however, gave poor promise of sustaining a load of 3½ tons per square foot. The valley was, therefore, sounded thoroughly, the results showing that a crossing at this point, if not impossible, was at least impracticable. The sounding was done with one Sullivan drill outfit and one gas pipe wash drill outfit. The rods were washed down by hand pump to 220 ft. below mean sea level, where rock was encountered. Above this rock there are layers of decayed vegetable matter, loose sand and shell mixture and light surface soil. Such is the consistency of the whole that a 1½-in. wash drill bit was driven 222 ft. in nine hours, including the time taken up in connecting new joints of pipe to the drill rod. In many places a 20-ft. joint of pipe was washed down in three minutes.

An estimate was then made for a steel viaduct spanning the valley. The estimated cost of such a structure was $800,000. It was finally decided to keep to the east side of the Gatuncillo to a point above Monte Lirio, then across the valley and follow the location "D" and "E" shown on the accompanying map. As it was desirable to have Gatun on the main line, and not on a spur line only, it was decided not to run the line from Mt. Hope directly southeast, although this would have saved a long detour. As it was found necessary to throw the line farther and farther away from the canal axis to insure a safe crossing of the Gatuncillo, the level grade project was abandoned and a balanced location was made as far as possible.

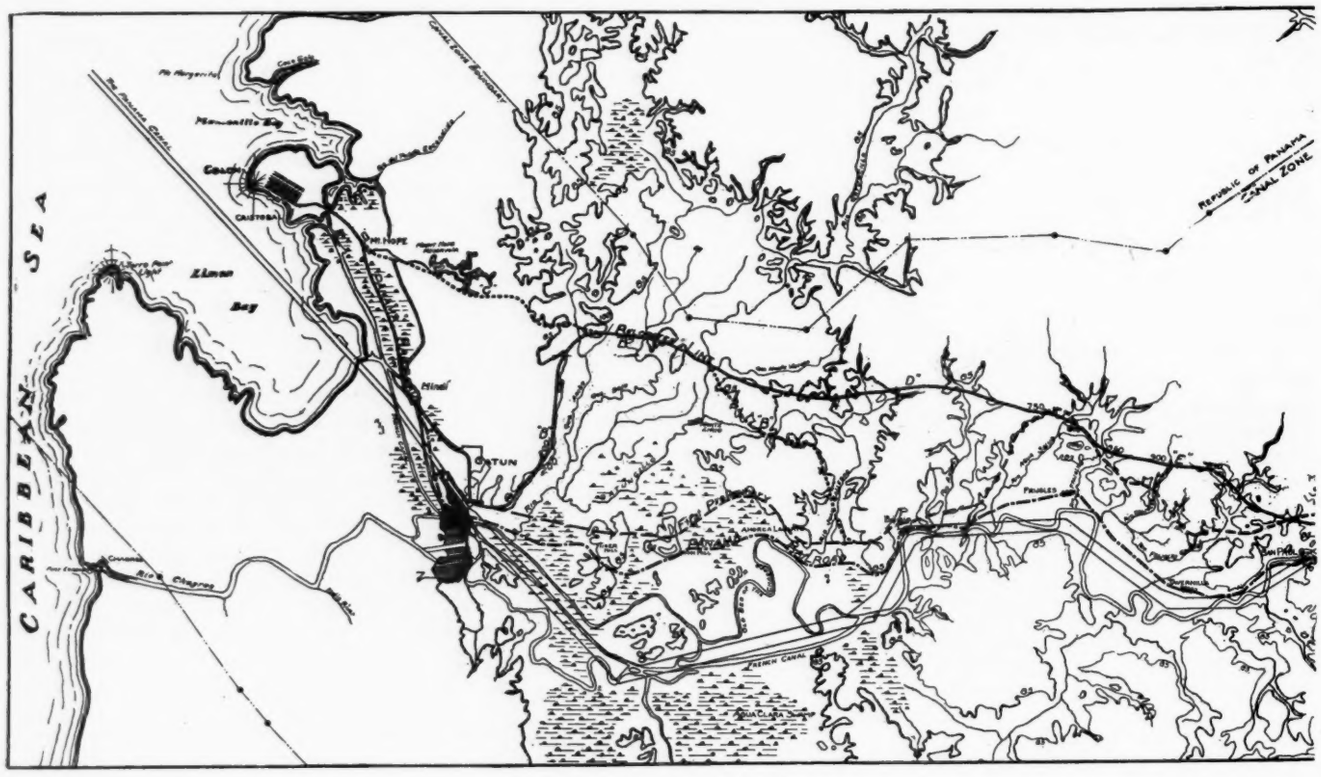
From Mindi to Gatun, 2.2 miles, the line rises by a series of broken grades from elevation 5 to elevation 95. Construction was pushed on this stretch. From Gorgona to Bas Obispo, 2½ miles, the line is a side hill location following the high bluffs of the Chagres river. This part was accepted and work was begun in December, 1907. At Bas Obispo the line enters the canal prism at elevation 95.00 and seeks its own location after leaving the canal berm at Pedro Miguel. The location from this point to the junction with the operated line just north of Corozal and four miles from Panama, was accepted after a number of lines had been run out with hopes of finding a low saddle in Miraflores river. It was finally decided to drive a tunnel through this ridge to avoid a 130-ft. open cut, approximately 800 ft. long. This tunnel, the only one on the line, is 815 ft. long, of which 400 ft. is through solid rock.

The maximum grades occur on the Atlantic and Pacific approaches to the high levels, absolute maximum being near Gatun, a short stretch of 1.3 per cent. compensated. From Gatun to San Pablo, 27 miles of balanced location, the maximum grade is 0.45 per cent. compensated, this being maximum for a single engine and train, assuming that pushers will be used on the approaches. From Mindi to Bas Obispo, 26.7

*From an article in the *Purdue Engineering Review.*

miles, the re-located line has 34 curves, there being 2,400 ft. of 7 deg. curves, 3,900 ft. of 6 deg. curves, 2,500 ft. of 4 deg. 30 min. and 4 deg. curves, and 2,500 ft. of 3 deg. 30 min. and 3 deg. curves, the remaining curves being less than 3 deg. Talbot's spiral is used on all curves of 2 deg. or over. The re-located line has about one-half of the curvature of the operated line.

Construction was begun in June, 1907, at Gatun and Miraflores. The construction engineer on the isthmus has eight or nine months of the year to contend with daily rains, and exceptionally heavy rains occur every three or four days, the new earth embankments becoming so saturated that slides frequently occur. The surface soil is mostly of soft red loam, which, when dry, is ideal for excavating, either by hand or steam shovel, but the slightest amount of moisture makes it semi-liquid. Although all of the work on the Panama Railroad is not over 90 ft. above mean sea level and only 9 deg. 12 min. north of the equator, the ocean breezes temper the tropical heat so that construction work is no more trying



Panama Railroad Relocation.
Atlantic side of the Isthmus.

than similar work in the United States during the hot months.

The lack of roads and the topography of the country prevent the use of teams and scrapers. For the same reasons it was found necessary to put in an unusually large number of spur lines, temporary tracks connecting the old main with the re-located line, used for equipment, material and canal haul.

West Indian negroes are being used as laborers of all kinds, including track gangs, excavating gangs, steam shovel pit crews, culvert gangs and piledriver crews. Each gang has one or two white foremen, although in a few exceptional cases the foreman is a negro. This class of labor, while far from ideal, is somewhat better than generally assumed.

The excavation is done either by hand, with one-half yard Decauville cars (pan cars) or by steam shovel supplied with contractors' or standard equipment. All large cuts are taken out by steam shovels, hand gangs being used in short cuts only, a 400-ft. haul being the maximum. Where a large cut is encountered, which, if allowed to stand until track and shovel reach that point, will delay the work, a temporary line is cut through by hand on a high grade, thus pushing track continually ahead of steam shovels. This method also enables the pile drivers to be in advance of final roadbed, thus supplying a firm dumping track for railway or canal excavation. Culvert and bridge material can thus be unloaded where desired.

At present about 17 miles of main line have been constructed, also 18 spurs varying in length from 750 ft. to 9,560 ft. Spur No. 19, 6,800 ft. long, is now under construction. This spur will enable construction to be started north and south from station 746 to join the work as it is being pushed north from station 1,000 and south from station 205. The Pacific end of the re-location is practically complete.

The work south from Gatun (station 121) is for the first four miles side hill work, and a pioneer shovel is benching in and casting over. As soon as a roadbed is made to station 300 in this manner the side hills will be used as borrow banks to fill in the Gatuncillo river crossing. This is made on two earth and rock embankments from 60 to 70 ft. high and 3,600 and 4,400 ft. long. These embankments alone will require 2,485,000 cu. yds. of material. It would take the entire output of the Culebra cut force, consisting of some 56 steam shovels, two months to build these embankments. This part of the work is not being rushed at present, the equipment of the railway being insufficient to undertake this particular stretch, but upon completion of the excavating work of the Pacific division (canal work) the shovels and rolling stock of this division can be used to good advantage by the Panama Railroad. There is practically no limit to the borrow banks, assuming maximum haul at 3½ miles. Efforts are still being made to eliminate these large embankments, but the fact that grades must be kept at or above 92.00 makes this a difficult proposition.

The forces working north towards Colon are now at station 1,000; work on this residency was begun December, 1907, at Gamboa, near station 1,360, and at San Pablo, station 1,080, in July, 1908. The work from station 1,360 to 1,000 has re-

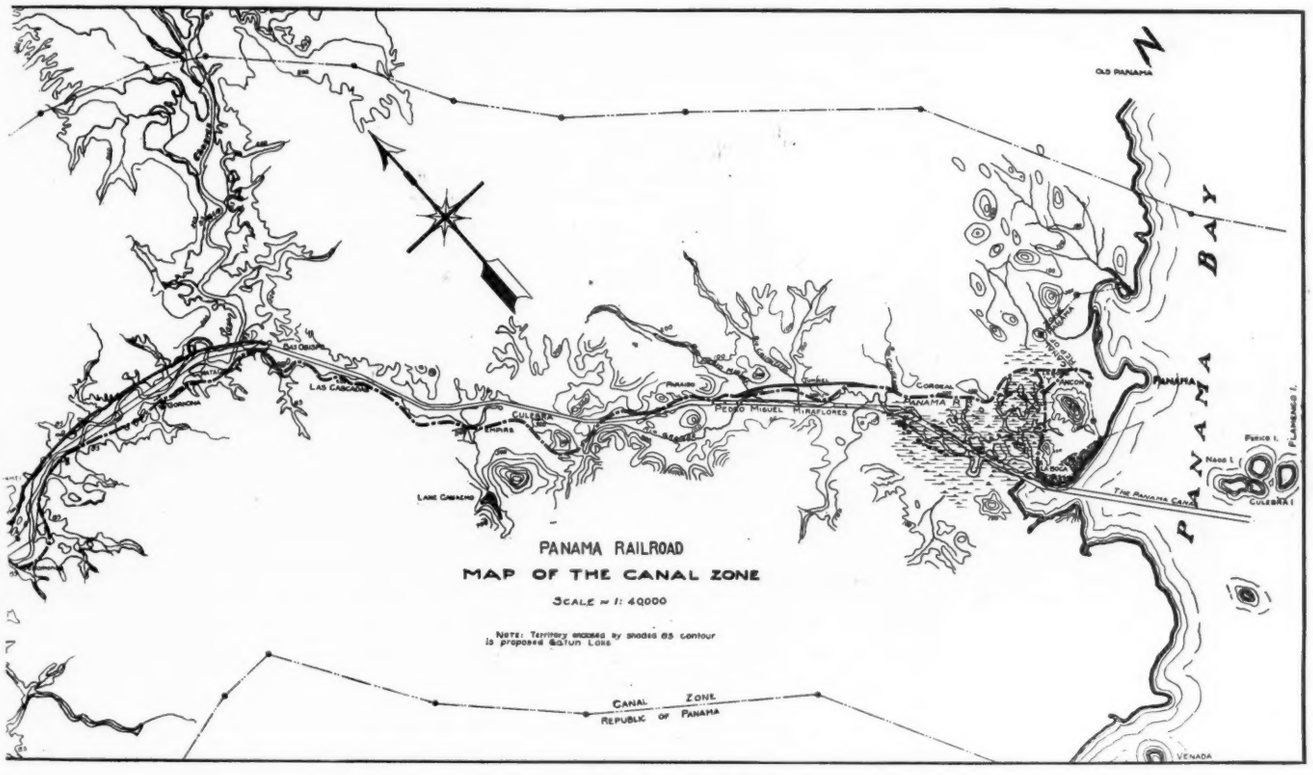
quired three spur lines, spur No. 7, at San Pablo, being the longest, 9,500 ft. long. Spur No. 13, at Gorgona, was the most difficult to construct. The line here is located on the high bluffs of the Chagres river (stations 1,360-1,190). Spur No. 7 connects with the re-location at station 1,080, and as the work between stations 1,360 and 1,080 is exceptionally heavy, it was found necessary to have also a connection between these points. Near station 1,244 the operated line has a dry season gravel pit in the Chagres river, the end of the gravel pit track being just across the river from the re-located line, but the difference in elevation is 50 ft. The spur constructed has 18 deg. as the maximum degree of curve and a maximum grade of 8 per cent. It was found necessary to use an island to find support for a switch back, the new line being reached from here by a trestle driven over the river on a 10 deg. 46 min. curve and a 5 per cent. grade. This spur was operated very successfully and proved to be an economical connection.

There are five long embankments in this residency, all over 3,500 ft. long and from 30 to 55 ft. high. This residency has a direct connection with the canal tracks near Bas Obispo on one end and San Pablo on the other, and the embankments are splendid dumping grounds for the spoil from canal excavation.

All these embankments will be submerged to within 7 ft. of the top when Lake Gatun reaches its proposed elevation of 85 ft. above sea level. All slopes of submerged embankments are 2 to 1. For heights from 10 to 30 ft., top width is 20 ft.; heights from 30 to 50 ft., 30-ft. top width; heights greater than 50 ft., 40-ft. top width. Standard dry embankments have a 20-ft. top width, with a 1½ to 1 slope. In cuts the roadbed has a standard width of 29 ft., with wide V shaped ditches to carry the heavy rainfall.

The culverts on the re-located line are with a few exceptions placed from 20 to 35 ft. above the bottom of the stream. When Lake Gatun is formed, all land on both sides of the line lower than elevation 85 will be permanently flooded, so the most important function of these culverts is to establish connection between Lake Gatun proper and the flooded river valleys east of the re-located line. For this reason they are placed high enough to be above the sedimentary deposits of streams feeding the lake. Streams in small valleys which will not be land-locked are taken care of by pipe culverts large enough to carry the wet season discharge. These are expected to clog up in the course of three or four years and be utterly useless, consequently a light grade of corrugated galvanized iron pipe is being used. Vitrified clay pipe was tried, but due to the fact that the embankments are, for the most part, filled in from high trestles, it was too easily broken.

Concrete culverts are of two types. For openings from 6 sq. ft. to 56 sq. ft. the standard rail top box is used. This is made of gravel concrete strongly reinforced with old rails. For openings larger than 56 sq. ft., semi-circular arches are being used, with rail reinforcement in the foundation in the footings and ¾-in. rod reinforcement in the arches and side walls.



Panama Railroad Relocation.
Pacific side of the Isthmus.

There will be two bridges on the re-located part of the line. One is completed, the Chagres river bridge at Gamboa, which spans the opening through which the Chagres flows into the basin of Lake Gatun. This bridge has a total length of 1,320 ft., consisting of eleven 80-ft. span, plate girders at the north approach, a 200-ft. riveted Warren truss as the main span, and three 80-ft. span, plate girders for the south approach.

The piers rest on grillage piles driven to rock. The other steel bridge, plans for which have not been published, will span the Gatuncillo river. The policy of the road is to have as few steel spans as is practicable, concrete culverts and bridges supporting the ordinary track and roadbed being considered far superior.

The road is 5 ft. gage and the total length is 48 miles. It is expected that running time from the Atlantic side to the Pacific side will be 1 hour and 30 minutes or less. R. Budd is Chief Engineer and F. Mears is the engineer in charge of construction.

GOVERNMENT REGULATION OF RAILWAY CORPORATIONS.*

BY EMORY R. JOHNSON,
Professor of Transportation and Commerce, University of Pennsylvania.

The regulation of railways is a perennial problem, because it is concerned with the maintenance of equity, with the establishment of just relations among places, among persons and among commodities. These relationships are, as every one knows, determined by economic and social conditions, and thus are certain to change with every alteration of those conditions. Thus, what is just to-day as regards services and charges may have been unjust ten years ago, and may not be in accordance with the public welfare a year hence.

The force of this truth is clearly illustrated by the struggle which has been waged for more than a generation between the north Atlantic seaports in regard to the rates on import and export traffic. In the early 80s the bitter warfare of these ports with each other, and of their respective railway lines with one another, was temporarily ended by arbitration proceedings establishing the well-known seaboard differentials. The rates accorded each of the ports were made to harmonize as closely as practicable with the economic advantages and the commercial and shipping facilities possessed by each of the rival cities. That adjustment, however, as was to have been expected, proved to be only a temporary one. Transportation conditions on the ocean and on the land changed year by year, and the facilities for handling traffic at the several ports underwent alterations. The industries in the traffic background tributary to each of the ports developed along varying lines. Thus we find that New York has twice, since 1882, insisted upon a modification of the seaboard differential rates. The differentials were changed by the Interstate Commerce Commission in 1898 and again in 1905. For a year past the trunk lines have been on the verge of a rate war because the city of Boston, supported by its railway lines, is demanding a more favorable treatment than has been accorded to it in times past.

I refer to this struggle of the rival Atlantic seaports, not to pass judgment upon the merits of the questions in controversy, but merely to show that as long as these great rival trade centers advance along independent lines of industrial progress, frequent readjustment of rates will be unavoidable. It is equally certain that future experience as well as that of the past will require the adjustment of these rates by intervention of the government. The great problem of railway regulation, not only in this case but in every case, is the equitable adjustment, by public authority, of the relative rates to and through the great centers of industrial and trade competition.

Can the government, however, promote justice? Is it possible so to regulate inter-railway relations as to promote the public welfare and to maintain a greater degree of equity than can be secured by leaving unregulated the clashing economic forces? The best and largest answer to this profound question is given by the experience of the states and the federal government during the past four decades. The American people, like other people, may be wrong at times and may err in detail; they may, under the strain of a severe contest, be unduly radical for a while; but in the main the people of this country decide public questions rationally and wisely. In the long run we are not a radical but a conservative people; and the very fact that for four decades practically all the states, as well as the national government, have moved steadily forward towards a progressively increasing regulation of railways is indisputable proof of the fact that such action is not only desirable but effective and wholesome.

The necessity for government regulation is thus no longer a subject for debate. The practical question is not whether the government shall regulate, but how. During the past 40 years two kinds of regulation have been thoroughly tried out, and it is fairly clear now which kind is best adapted to American conditions. When the states, about 1870, began to enact laws affecting the relations of the railways with each other, with the public and the government, many of the states in the East, led by Massachusetts, established commissions with power to investigate the railways and to report the results of their investigations, with recommendations, to the attorney-general of the state and to the legislatures.

These commissions had no power to establish rates, to issue mandatory orders, or to enforce their decrees by process in the courts. On the other hand, numerous states in the West and some in the South created railway commissions endowed not only with power of investigation, but with authority to establish or change rates, to issue orders and to secure the enforcement of their orders by appeal to the courts. This latter type of legislation has been called the "granger" laws, and it has often been held up to ridicule not only by railway officials but by impartial students of transportation. While the granger laws were being enacted the severe panic of 1873 overwhelmed the country and caused serious depression of business for a period of fully six years. The granger laws had not caused the panic, and, as a matter of fact, they had comparatively little to do with the unfortunate position of the railways which suffered, together with all business enterprise, during the period of the depression. Naturally enough, however, all the ills of the railways were attributed to the granger laws, with the consequence that Wisconsin and Iowa and some, but not all, of the states that had established mandatory commissions repealed their stringent lews and replaced their strong commissions with weak ones without power to regulate railway charges.

For somewhat over a decade preceding 1890 there was comparatively little effort made by the states to bring the railways under effective national regulation; but in the later 80s the growing prevalence of flagrant discriminations as between persons, places and commodities began to arouse the states to activity and caused the federal government to enact the Interstate Commerce Act of 1887. From that time to the present—roughly speaking during the past 20 years—the trend of government regulation has been steadily towards the re-enactment of the principles of the granger laws.

Ten years ago 30 of the states had railway commissions, but by that time the substitution of strong commissions for weak ones had progressed so far that only one-third of the states had commissions without power over rates. At the present time 40 states have commissions and only five of them adhere to the advisory type. During the five years ending in 1907, 15 states created or reorganized their commissions, and all but two of the 15 states—Pennsylvania and New Jersey being exceptions—established commissions with power to issue orders and to adjust rates.

The trend of national legislation during recent years has run parallel with that of the states. The act of 1887 did not definitely define the powers of the commission over rates, but for nine years the commission, with the support of the courts, interpreted the law in such a way as to give the commission power to change rates. In 1896 this power was questioned by the Supreme Court, which, in the following year, definitely held such power not to have been granted to the commission by Congress. When this decision was reached by the Supreme Court the United States was passing through a period of business depression, and there was, consequently, little disposition to subject railway charges to effective government control. With the return of normal business conditions and with the rising tide of prosperity, there arose an imperative demand for the real regulation of interstate railways. The response to that demand was the enactment of the Elkins Act in 1903, and the Hepburn Act of 1906.

With the passage of these two laws the national government

*From an address before the Economic Club of New York, Jan. 28, 1910.

took three long steps forward in the regulation of railways. By the Elkins Act the principle was established (1) that the published rate is the only legal rate; that the charges for the public service of transportation shall be public, and that any secret deviation from this public rate shall be a criminal offense. (2) By the Hepburn Act of 1906 the Interstate Commerce Commission was definitely given the power to adjust these public rates with a view to making them just and reasonable. The principle was laid down that the rates for the public service of transportation shall be reasonable and that the legislative authority of the United States, subject to the higher criticism of the courts, and not the railway corporations, shall have final decision as to the reasonableness of those charges. (3) The other great feature of the Hepburn Act was the establishment of publicity in railway management. By requiring the railways to keep their accounts according to a uniform system, and by making the books of the corporations open at all times to inspection by officers of the Interstate Commerce Commission, Congress laid down the principle that the railway business was henceforth to be a public one in the fullest sense of the term.

This brief reference to the trend of state and federal regulation of railways shows clearly that the American people, after experimenting with different methods, have decided in favor of real regulation, and have practically abandoned reliance upon the advisory supervision of railway corporations. This, however, by no means fully states the change that has taken place during recent years in the government control of transportation companies.

Railway regulation may be either negative and punitive or it may be positive and administrative. Until recent years the laws of the states and of Congress have been based mainly upon the principle of the necessity of prohibiting railway abuses and of punishing the railways for engaging in certain objectionable practices. Such legislation is negative in character. We are now entering upon an entirely different phase of government control; we are realizing that the function of the government should be not merely to prohibit, but that it should seek, by administrative regulation, to bring about better conditions. This relatively new phase of railway regulation is illustrated by the numerous safety appliance laws that have been enacted during the past decade; and the disposition of Congress to deal administratively with the problem of railway control is shown by its giving the Interstate Commerce Commission power to prescribe uniform accounts and to inspect the books of the railways.

The states have gone even further than has the United States in the administrative regulation of railways, and it is noteworthy that it has been the conservative states like Massachusetts, New York and Ohio, as well as such states as Wisconsin and Texas, which are less trammeled by conservative traditions, that have done most to bring the railways under administrative control. As yet the states and the nation are in but the beginnings of this movement towards administrative control of railways. Ultimately this part of government regulation will far exceed in importance the measures taken to prohibit undesirable practices and to punish the railways for crime.

The president of the United States, building upon the basis of experience, is now asking Congress to advance the corrective and administrative regulation of railways several steps beyond the point it has thus far reached. He makes five major recommendations:

(1.) The creation of a United States court of commerce.

(2.) The authorization of associated action of the railways in the making of competitive rates.

(3.) The granting of power to the Interstate Commerce Commission to investigate rates upon its own motion, and to inquire into justice of proposed rates before they shall be put in force.

(4.) The prohibition of the lease by a railway company of a competing line, or the purchase of its stock.

(5.) The government regulation of railway capitalization.

It is to be expected that differences of opinion will exist as to the merits of some or all of the President's recommendations. The President is, however, to be commended for placing before Congress and the American people for serious and thoughtful consideration a definite legislative programme. Ultimately, if not immediately, most, and possibly all, of the President's recommendations will be embodied in law. I venture this prophecy because the propositions put forth by the President seem in the main to harmonize with our experience; by which I mean that the trend of regulation seems to point in the direction which the President proposes to lead.

The establishment of a United States court of commerce would undoubtedly expedite the work of the Interstate Commerce Commission, would bring about the more speedy settlement of controversies, and would give unity to the judicial interpretation of the interstate commerce laws to the advantage both of the railways and the public.

Congress should have long since modified the Sherman anti-trust law, as it was interpreted by the Supreme Court in 1897 in the Trans-Missouri Freight Association and in the Trunk Line Association cases, so as to permit railways to work out their competitive rates openly and legally through their traffic associations. Everybody knows that it is absolutely necessary for the railways to agree upon their competition rates, and the present practice of the railways, while not in violation of the letter of the law, transgresses its spirit and does so by common consent. It is unwise as well as unjust to maintain laws that prohibit what are known to be necessary and desirable practices.

Doubtless the President's proposition to confer upon the commission the power to investigate rates upon its own motion and to suspend the levy of proposed rates during such reasonable period as the commission may require for investigation into the justice of the changes proposed, will be debated more earnestly than any other of the five suggestions. If, however, it be conceded that the Interstate Commerce Commission should possess power to adjust rates so as to minimize unreasonable discriminations, it logically follows that such a grant of authority should be given the commission as will enable it to accomplish its purpose. Personally, the proposition seems to me sound in principle and one that will work advantageously in practice.

As to the advisability of prohibiting the lease of one railway by another and of making it unlawful for a railway to purchase the stocks of a competing line, I have doubts. The past efforts of the states and of the federal government to prevent the integration of business have been almost futile. It seems to me that the large enterprise is taking the place of the small one as the result of the working out of economic laws. If this be true, statutes to check railway amalgamation will doubtless be evaded; if they could be enforced, the effect would be of questionable public advantage. The purpose of this provision of the law would be to check monopoly, but the way to deal effectively with railway monopoly is to regulate services and charges. The present law, as amended in the manner suggested by the President, would subject the railways to effective regulation and the prohibition of railway integration seems unnecessary.

The government regulation of railway capitalization, on the other hand, is highly desirable. The admirable work done by the Massachusetts Railroad Commission, and what is being accomplished by the railway commissions of New York, Wisconsin and other states, makes it clear that the federal government should, without further delay, establish effective regulation of railway capitalization. It is claimed by those opposed to this policy that capital cannot be secured for new enterprises, and possibly not for the extension of existing systems if speculation and stock watering practices are made illegal.

On the other hand, it may be urged with even greater force that measures which will tend to make railway securities attractive to those who are seeking relatively safe investments will enable the railways to secure practically an unlimited amount of funds for the development of our transportation system.

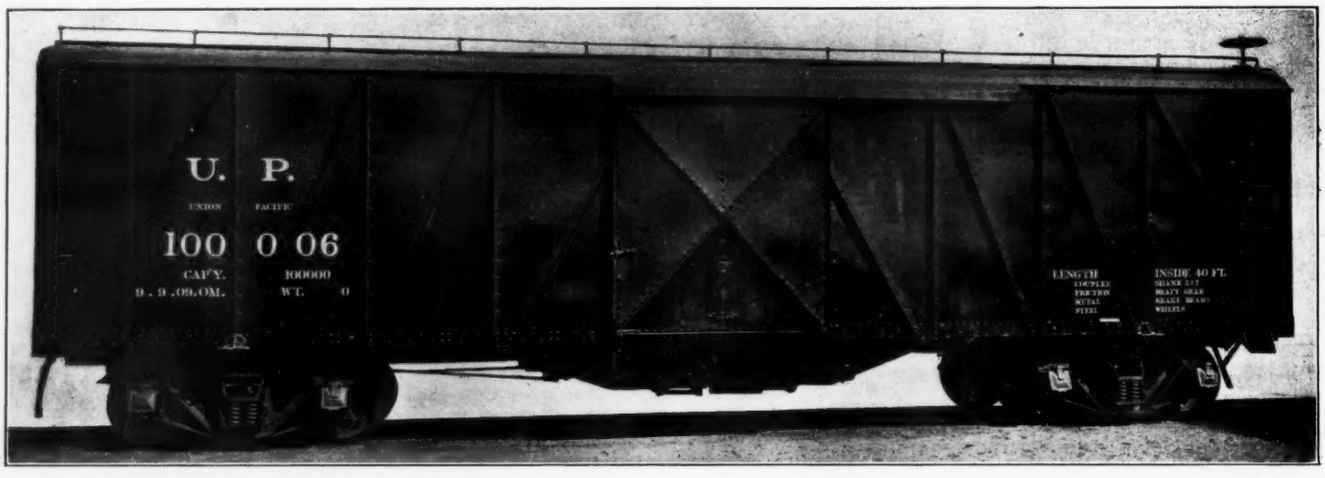
From certain quarters the plea is heard that this is not the time to enact laws widening the scope and increasing the certainty of government regulation of railways; that time must be given the carriers to adjust themselves to the requirements that have already been imposed upon them; that the urgent need of the public is for more railway mileage and that further government control of the railways will check their prosperity.

This argument might be given weight if it were true that our railways were not now highly prosperous, or if the proposed legislation would in any way interfere with their healthy growth. As a matter of fact, however, the tide of railway traffic is rising, and the revenues are yielding good profits. Nor can it be shown that the legislation proposed by the President would either bring about unreasonably low rates or diminish the flow of capital seeking investment in railway securities. Indeed, it seems certain that the railway corporations, as well as the public, will in the long run gain much if the ethical ideals back of the regulative measures now under consideration are embodied in effective legislation. Laws that are fair to all do no one harm, and they promote the common good; they aid the steady advance of order and harmony under the broad shield of justice.

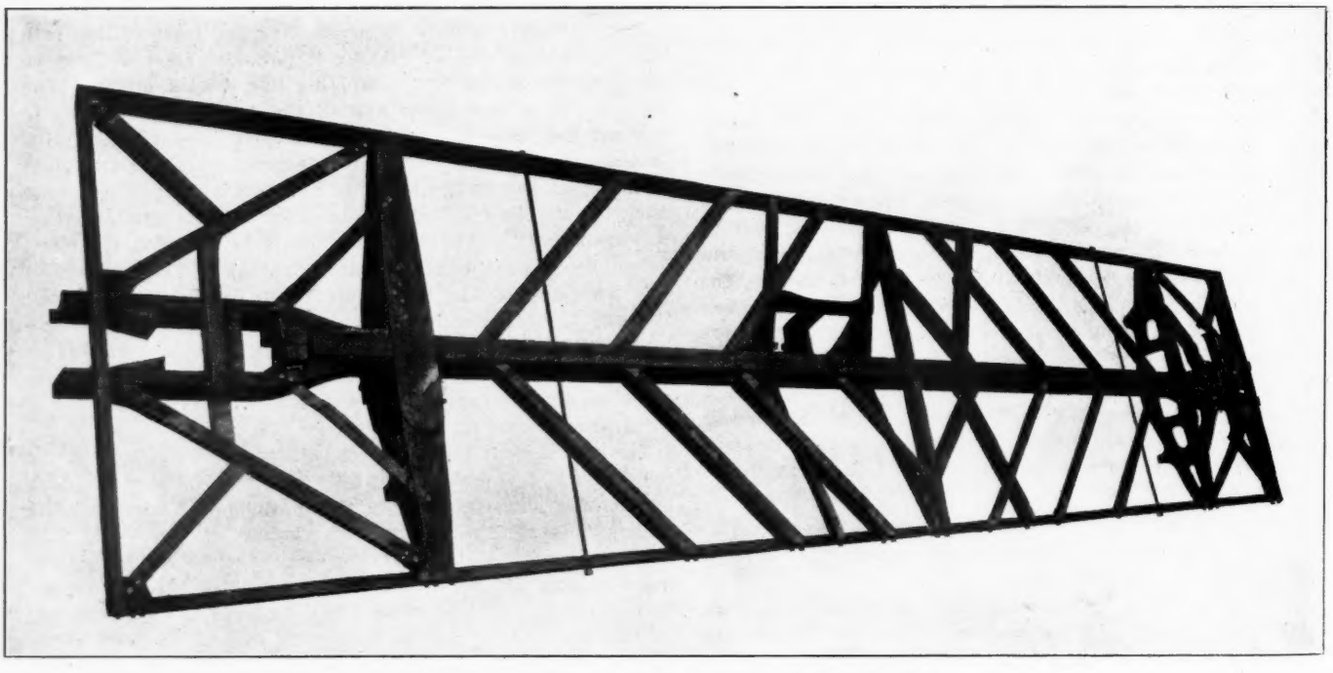
STEEL BOX CAR FOR THE UNION PACIFIC.

Two sample steel box cars were built at the Omaha shops of the Union Pacific early in 1907 and were illustrated in the *Railroad Gazette* February 22, 1907, page 250.

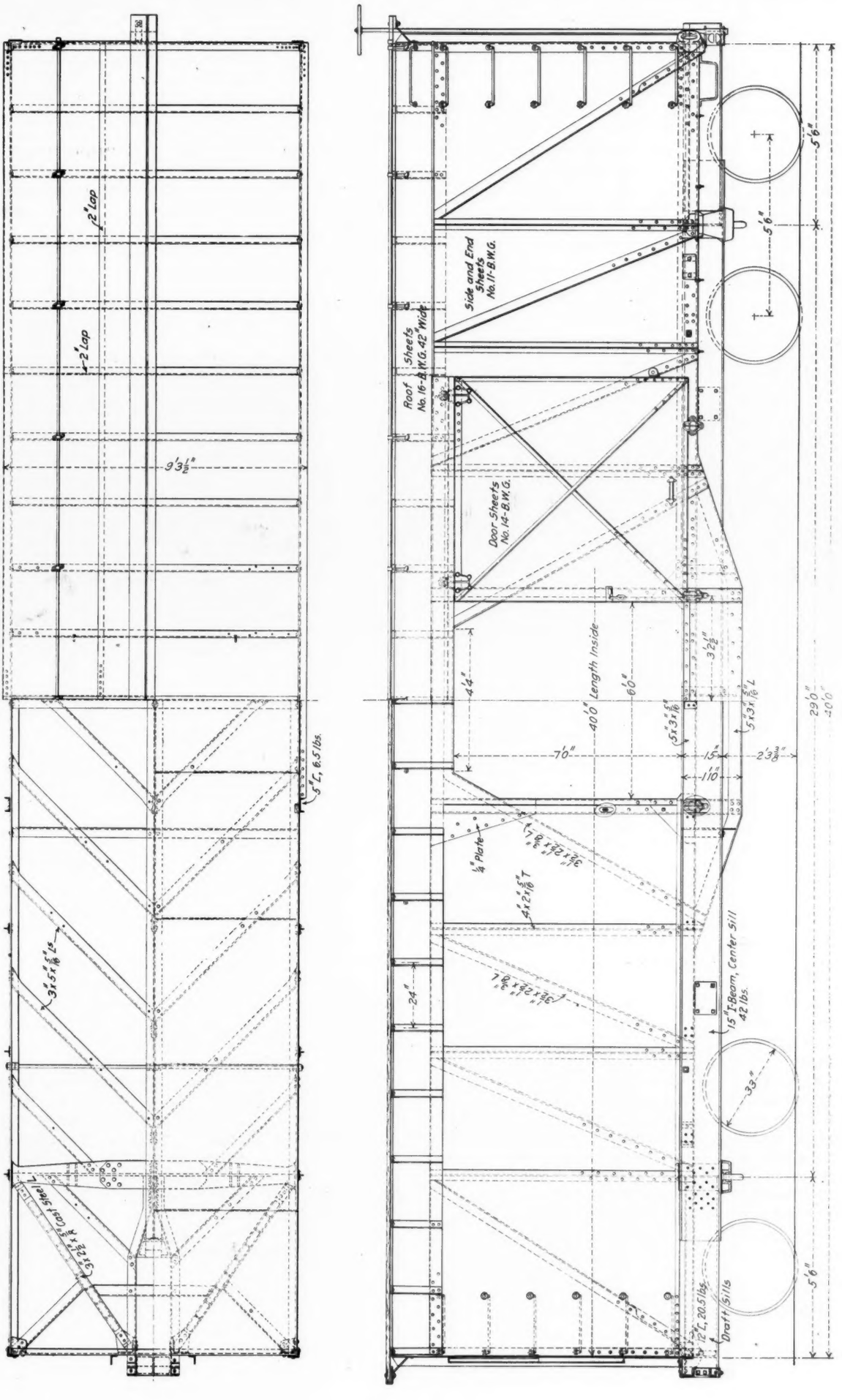
Another steel box car has been recently built at the same shops much on the same lines as the previous ones, and it is here illustrated. The principal change is in the diagonal bracing of the sides, which, in the former cars, extended from the top of the door-way to the post over the body bolster, while in the new car there is a diagonal brace between each pair of posts. These braces are steel angles 2½ x 3½ x ⅜-in. There is also some attempt to lighten the car and the diagonal braces in the underframe and the angles at the side sills have been changed from 3½ x 5 x $\frac{5}{16}$-in. to 3 x 5 x $\frac{5}{16}$-in. The thickness of the sheet metal for the sides of the new car remains the



Steel Box Car for the Union Pacific.



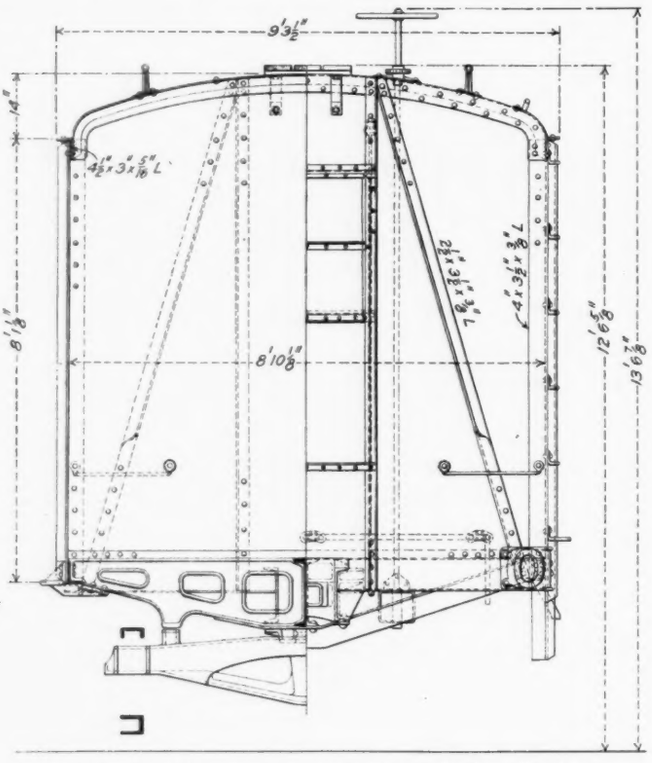
Underframing of Steel Box Car; Union Pacific.



Plans and Elevation of Steel Box Car; Union Pacific.

same as in previous cars, No. 11 B.W.G. 12 in., and the thickness of the roof sheet is ⅛ in. as before. At the time the first steel box cars were built it was thought by some that the effort to keep down the weight by making the side sheets 0.12 in. thick was carried too far and the sheets should be thicker, but the experience of three years with the first cars seems to have warranted the use of sheets the same thickness in the new cars.

The wheels of the new car are heavier than those on the old one, the weight of the two new trucks being 14,320 lbs., while the old ones weighed 13,100 lbs. The new car body includes pushpole pockets, roping and jacking castings which



End Elevation of Steel Box Car; Union Pacific.

were not on the old car. With the changes here indicated the difference in the weights are as follows:

Car 72851, prviously illustrated: body, 25,350 lbs.; truck, 13,100 lbs.; total, 38,450 lbs. The new car, here illustrated, weighs: body, 23,480 lbs.; truck, 14,320 lbs.; total, 37,800 lbs. The weight of the car body has been reduced 1,870 lbs.

TRACTIVE POWER OF LOCOMOTIVES.

BY WILLIAM N. ALLMAN.

The tractive power of a locomotive decreases as the speed of the locomotive increases. It is therefore evident that the maximum effort is available at starting, and that it gradually decreases as the piston speed increases, due to the fall in mean effective pressure, increase in friction, capacity of the boiler, the means used for admitting steam and exhausting it from the cylinders, condensation and leakage in the pipes and cylinders, the back pressure on the pistons, and the resistance of the train.

The tractive power is based entirely upon the capacity of the cylinders, and it is assumed that the weight on driving wheels will be sufficient to develop a corresponding adhesion. The hauling capacity of a locomotive can only be determined by knowing the tractive force as well as the resistances which retard the movement of the train.

There is a limit to the tractive power of the locomotive; it cannot possibly be greater than the tractive power of adhesion, which is the weight on driving wheels at the rail multiplied by the coefficient of static friction between the wheels and rails; nor can it be greater than the cylinder tractive effort, which varies with the steam pressure, the diameter and stroke of the cylinder and the diameter of driving wheels. The fact that the adhesion of the driving wheels to the rails must be used sets a limit to the tractive effort of the locomotive; if the cylinder power is increased beyond a certain limit, slipping of the wheels will occur and the trac-

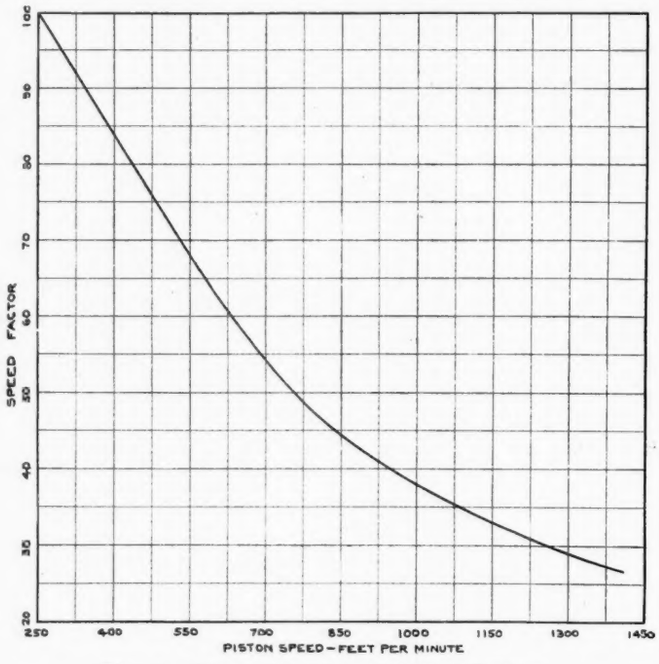


Fig. 1—Piston Speed and Speed Factors.

tive power will not increase, but, to the contrary, will actually diminish. It is therefore evident that the tractive power is limited, independently of the power given out by the cylinders, by the weight on the driving wheels, and by the friction between the wheels and the rails. It has been found that as high as 28 to 30 per cent. of the weight on drivers at the rails has been utilized as tractive effort; this occurred, however, only under first-class conditions and on well-sanded rails. In ordinary practice this percentage usually proximates 22 to 25 per cent. of the weight on driving wheels.

The power developed is measured by the product of two factors, the tractive force and the speed in miles per hour, as

$$P = T \times V \times .00266 +$$

where P = Horse-power,
T = Tractive power in pounds,
V = Speed in miles per hour.

The maximum horse-power which the engine can develop is fixed, when the grate is of sufficient size, by the steam-producing qualities of the heating surface and steam consumption of the cylinders; the efficiencies of both, however, are slightly increased when the speed is increased.

It is desirable to make the grate area about one-sixtieth of the total heating surface, which will give enough heating surface to absorb the heat produced at the grate by combustion, with proper efficiency. If the heating surface is much less than 60 times the grate area more heat will be produced at the grate than can be transferred to the water, and the boiler will lose part of its efficiency, while if the heating surface be much above 65 times the grate area, the increase in heat-absorbing power will, in most cases, be so slight that the increase in boiler efficiency will not compensate for the increase in weight which is involved.

It has been the practice to reckon the locomotive on tractive power rather than horse-power, since the latter is dependent upon speed, which is a variable quantity, and any figures as to the horse-power of locomotives are liable to be misleading.

A simple rule for deriving the horse-power when the tractive power is known is to multiply the tractive force in pounds by the speed in miles per hour at which the locomotive can handle its heaviest loads, and multiply this product by .00266.

It is noteworthy that the tractive power of locomotives, comparing those built in the period of 1892 to 1895, with the present types, has increased about 60 per cent. in passenger service and 80 per cent. in freight service, while the average train loads in tons of 2,000 lbs. have increased about 68 per cent.

The effective tractive effort—that is, the force necessary to haul the train independent of the locomotive and tender—may be determined by deducting from the total available tractive force the force necessary to overcome the resistance of the locomotive and tender. This resistance may be determined from the following formula, which is slightly modified from that proposed by von Borries:

$$R = 8 + .087\ V + .0036\ V^2$$

where R = the resistance in pounds per ton (2,000 lbs.) of engine and tender.

V = speed in miles per hour.

In the calculation of tractive power the full boiler pressure is never realized, but it is occasionally used for purposes of

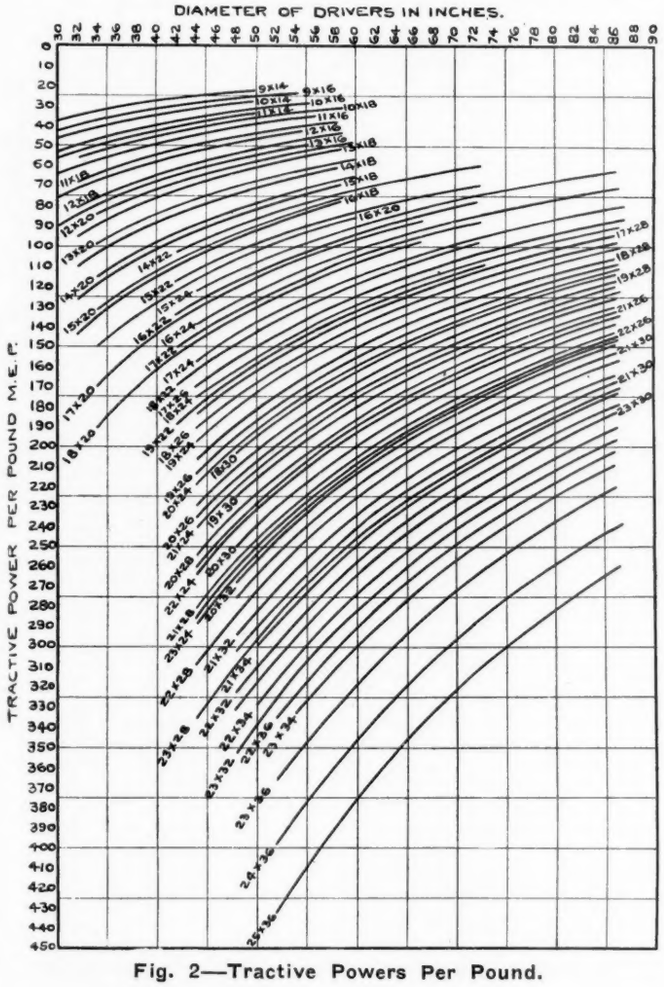


Fig. 2—Tractive Powers Per Pound.

comparing different locomotives. The usual percentage now generally accepted is 85 per cent. of the boiler pressure at piston speeds not exceeding 250 ft. per min. Some authorities consider, however, that the maximum should not be more than 80 per cent. of the boiler pressure.

The tractive power of a simple locomotive is obtained from the following formula:

$$T.P. = \frac{.85\ P\ d^2 s}{D}$$

where T.P. = Tractive power in pounds.
P = Boiler pressure,
d = Diameter of cylinder in inches,
s = Length of stroke in inches,
D = Diameter of drivers in inches.

The above formula is the one that is generally used, and the writer is of the opinion that there are a great many who do not know the rule as written out in full, and it will be noted

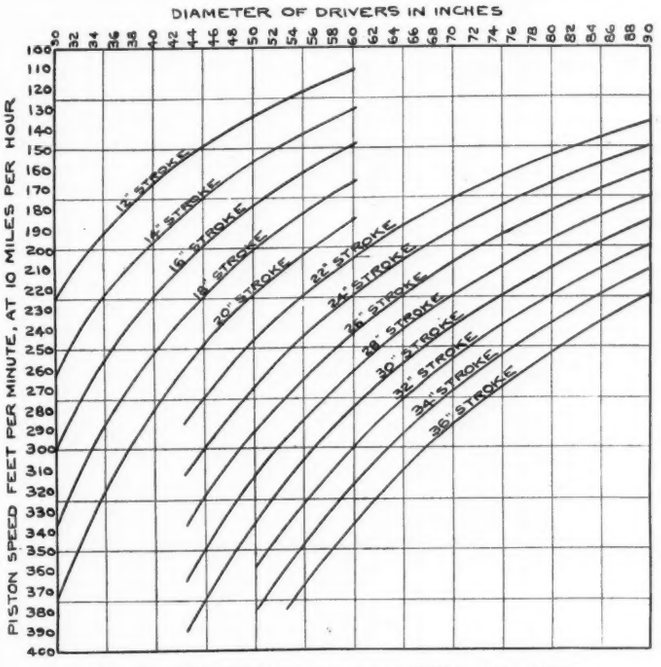


Fig. 3—Piston Speeds at 10 Miles Per Hour.

that the constants for the number of cylinders and the number of strokes in one cycle cancel out, and therefore do not appear in the general rule, which, when written out in full, is logically constructed thus: Area of cylinder multiplied by twice the stroke multiplied by two for the pair of cylinders, multiplied by the mean effective pressure, divided by the circumference of the driving wheel, and in the form of a mathematical equation stands:

$$T.P. = \frac{d^2 \times .7854 \times 2 \times s \times 2 \times P}{D \times 3.1416} = \frac{d^2 \times s \times P}{D}$$

The formula for calculating the tractive power of a shay-geared type of locomotive, as given by the Lima Locomotive & Machine Company, is as follows:

$$T.P. = \frac{d^2 \times s \times 1.5 \times P \times G}{D \times p}$$

where T.P. = Tractive power,
d = Diameter of cylinder,
s = Length of stroke in inches,
P = Mean effective pressure.
G = Number of teeth in gear run.
D = Diameter of driving wheel in inches.
p = Number of teeth in pinion.

In this formula the Lima Locomotive & Machine Co. use and recommend for the value of P or the "M.E.P." 75 per cent. of the boiler pressure.

It will be noticed that this formula is similar to the formula for the simple rod locomotive with the exception of the constant 1.5 (which is introduced because there are three cylinders used) and the geared ratio which for the Shay locomotive is about 2 to 1.

There is one thing to be noted regarding the tractive power of a locomotive; that is, as the engine grows older in service it becomes stronger, due to the wear on the tires thereby de-

creasing the diameter and the wear in the cylinders, and such increases as these may bring about slipping. It is the general practice when making calculations to use the dimensions of the new parts.

As mentioned above, the M. E. P. taken as 85 per cent. of the boiler pressure holds good up to 250 ft. per min. for piston speed, but as the speed increases beyond this point the M. E. P. is materially reduced.

Diagram No. 1 shows the piston speed and the speed factors corresponding to it; for example, we have a locomotive with a tractive power of 38,000 lbs. at a piston speed of 250, then if it is desired to obtain the tractive power for some other speed greater, say 550, we simply multiply the tractive power by .68 or $38{,}000 \times .68 = 25{,}840$ pounds. This curve is based on the information as published by the American Locomotive Company in its pamphlet on Train Resistance and Power of Locomotives, which was calculated from indicator tests of locomotives.

Diagram No. 2 shows the tractive power per pound M. E.P. for cylinders from 9 x 14 to 25 x 36 and for driving wheels 30 to 86 in. diameter; it is possible to obtain the tractive power of any simple locomotive by taking the results found from this diagram and multiplying by the M. E. P., as shown in table No. 1.

Diagram No. 3 shows the piston speed in feet per minute at engine speed of 10 miles per hour. Greater speed can be determined by multiplying the results of the proper factor indicated by the speed required. It might be fitting to state that in locomotive practice it has been found that the maximum piston speed should not exceed 1,600 ft. per minute. The economical speed may be placed at about 1,100 ft. per min.

With the three diagrams mentioned and table No. 1 it is possible to obtain the tractive power for any desired speed.

The formula generally employed for compound locomotives of the 4-cylinder type is:

$$\text{T.P.} = \frac{C^2 \times S \times \frac{2}{3}\,P.}{D} + \frac{c^2 \times S \times \frac{1}{4}\,P.}{D}$$

where T.P. = Tractive power.
C = Diameter, high pressure cylinder in in.
c = Diameter, low pressure cylinder in in.
S = Stroke in in.
P = Boiler pressure.
D = Diameter drivers in in.

Formula for 2-cylinder or cross-compound, assuming that the work done on the two sides is equal; it is only necessary to consider the high pressure cylinder in the calculations, allowing a sufficient decrease in boiler pressure to compensate for the necessary back pressure.

The formula as given by the Baldwin Locomotive Works is shown below:

$$\text{T.P.} = \frac{C^2 \times S \times \frac{2}{3}\,P}{D}$$

where T.P. = Tractive power.
S = Stroke in in.
P = Boiler pressure.
D = Diameter drivers.

Table No. 1.—*Mean Effective Pressure Based on 85 Per Cent. of the Initial Boiler Pressure.*

Initial boiler pressure.	M.E.P.	Initial boiler pressure.	M.E.P.
100	85.0	190	161.5
120	102.0	195	165.75
125	106.25	200	170.0
130	110.5	205	174.25
135	114.75	210	178.5
140	119.0	215	182.75
145	123.25	220	187.0
150	127.5	225	191.25
155	131.75	230	196.5
160	136.0	235	199.75
165	140.25	240	204.0
170	144.5	245	208.25
175	148.75	250	212.5
180	153.0	255	216.75
185	157.25	260	221.0

The *Railway and Engineering Review* shows in its issue of December 31, 1904, the following formula for compound locomotives which were used for making comparison of the different locomotives on exhibition at the St. Louis Exposition in 1904.

For two-cylinder compounds:

$$\text{T. P.} = \frac{.8\,L^2\,S\,P}{(R+1)\,D}$$

where T.P. = Tractive power.
L = Diameter of low pressure cylinder.
S = Stroke in in.
P = Boiler pressure.
R = Ratio of low pressure to high pressure piston area.
D = Diameter drivers in in.

This formula gives a result about 18 per cent. lower than the Baldwin Locomotive Works formula for two-cylinder compounds, which shows plainly that the data taken from tests run under the supervision of different authorities differ, evidently due to the general dimensions, steaming qualities and conditions under which the tests were made. This variation is not a serious one, and the experience of the designer can readily lead him to make his own deductions.

For four-cylinder compounds:

$$\text{T. P.} = \frac{1.6\,L^2\,S\,P}{(R+1)\,D}$$

For tandem compounds:

$$\text{T. P.} = \frac{P\,S}{D}\,(.62H^2 + .25L^2)$$

where H. = Diameter of high pressure cylinder.

Mallet compound locomotives. A formula devised and recommended by the American Locomotive Company for the calculation of tractive power of Mallet compound locomotives when working compound is thus:

$$\text{T. P.} = \frac{d^2\,C\,P\,S}{D}$$

where T.P. = Tractive power.
d = Diameter of low pressure cylinder.
C = Constant, slightly variable with the variation of cylinders, usually taken as .54.

The recommended formula of the Baldwin Locomotive Works is thus:

$$2 \times \frac{C \times P \times d \times s}{(r+1)\,D}$$

where C = a constant usually assumed to be equal to between 85 and 90 per cent., representing the percentage of the boiler pressure which will be obtained as M. E. P. in an equivalent single expansion engine.
P = Boiler pressure.
d = Diameter low pressure cylinders.
s = Stroke.
r = Ratio of high to low pressure cylinders.
D = Diameters of drivers.

From the above formulas it can be clearly observed that the authorities do not exactly agree on a set rule for the calculation of tractive power; but the variation on a comparative basis is slight and any of the formulas may be used without bad effect. It will be observed that the weight on drivers does not enter into the calculation of tractive power at all, it being assumed that the weight is sufficient to balance the tractive force developed, of course, as otherwise the driver must slip before the cylinder power is developed. The ratio of the weight on drivers to the tractive power generally runs from four to five.

FUEL IN ECUADOR.

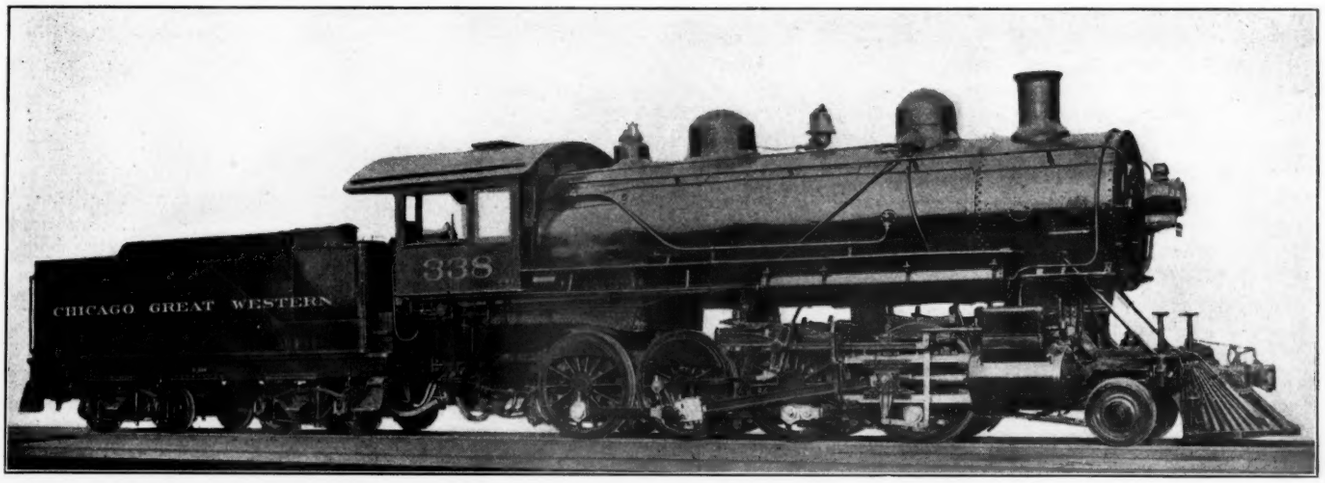
The Guayaquil & Quito Railway intends to change the fuel used on their engines in the near future. Fuel is the main difficulty now in the operating of the road; heretofore coal has been used, it being brought from Pennsylvania, costing $7.50 per ton when laid down in Durand. By the time it has been put on the cars and distributed over the terrific grades it stands the company $35 per ton. This item forms 90 per cent. of the non-revenue paying expenses and 60 per cent. of the operating expenses of the road. With growing trade it is felt that for economic reasons oil is the proper fuel, this doing away with long voyages, steamship freight, etc., oil being found in large quantities in the neighborhood of the road.

NEW LOCOMOTIVES FOR THE CHICAGO GREAT WESTERN.

Under the new administration of President S. M. Felton, the Chicago Great Western is improving its locomotive equipment by the purchase of a number of large passenger and freight engines from the Baldwin Locomotive Works. The order includes 20 consolidation, 4 ten-wheel and 10 Mallet; and all but the Mallets have been delivered.

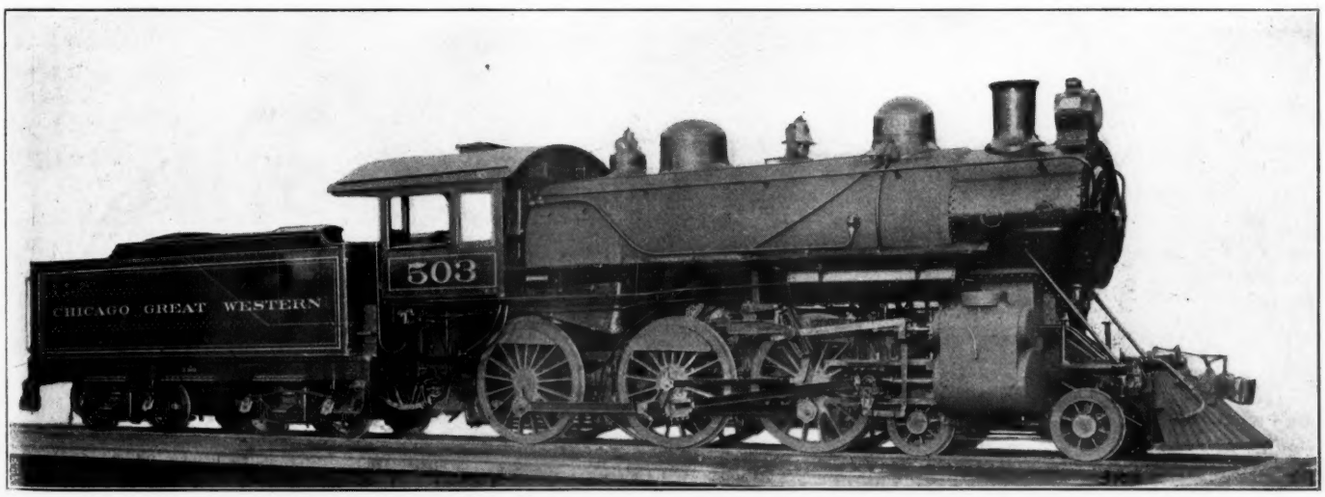
The consolidation engines have cylinders 24 in. x 30 in., 63-in. drivers and a weight of 187,000 lbs. on the drivers; the other principal dimensions are given in the table below. The engines have wide fireboxes, 66⅛-in. wide, extending over the rear drivers, and the valves are operated by the Walschaerts gear.

For passenger service on this line between St. Paul and Chicago it was decided that a 10-wheel locomotive with about 142,000 lbs. on the drivers would be the most suitable for the purpose, and the half-tone shows one of the four engines of this type which were ordered. These engines have cylinders 26 in. x 28 in., with piston valves and Walschaerts valve gear. The drivers are 73 in. in diameter and the firebox is 66⅛ in. wide. Other principal dimensions are given in the table. The passenger engines are equipped with Emerson's superheater with a superheating suface of 460 sq. ft. The boiler pressure is only 150 lbs. We expect to illustrate the Mallet locomotives later.



New Consolidation Freight Locomotive; Chicago Great Western.

	Consolidation.	Ten-wheel.
Cylinders	24 in. x 30 in.	26 in. x 28 in.
Driving wheels	63 in.	73 in.
Driving wheel base	17 ft.	15 ft. 3 in.
Boiler diameter	80 in.	70 in.
Boiler pressure	200 lbs.	150 lbs.
Tubes, number	413	24, 5-in., 203, 2-in.
Tubes, length	16.4 ft.	16 ft.
Firebox, length	108 1/16 in.	107 13/16 in.
Firebox, width	66⅛ in.	66⅛ in.
Heating surface, firebox	171 sq. in.	149 sq. in.
" " tubes	3,514 "	2,206 "
" " total	3,685 "	2,355 "
Grate area	49.8 sq. ft.	49.5 sq. ft.
Tank capacity	8,000 gals.	8,000 gals.



New Ten-Wheel Passenger Locomotive; Chicago Great Western.

THE RAILWAYS OF SPAIN.

The first railway in Spain was opened for traffic in 1848. It was a line of 17½ miles between Barcelona and Mataro. In later years this mileage was added to rather rapidly. By 1880 there were, according to the official reports, 4,645 miles of line in the country, which in 1884 had increased to 5,386 miles, in 1898 to 8,020 miles, in 1903 to 8,606 miles, and in 1907 to 9,104 miles.

But of this mileage only about 6,210 miles can be fairly regarded as standard railway. The lines all belong to private companies, but have been built in part by subvention from the government, so that as in France they are to revert to the state in 99 years. When new lines are undertaken the concession goes to the company which bids for the smallest subvention.

The total amount of subvention contributed by the state up to 1896 was reported to be about 800,000,000 francs ($160,000,000). The gage is different from that of the French lines, for obvious strategic reasons. In addition to the standard gage lines there are about 2,500 miles of narrow-gage roads in the country.

This railway mileage, of course, represents a large expenditure of capital. About 70 per cent. of the private capital invested in Spanish railways is foreign—much of it French, and accordingly several of the principal companies have their financial headquarters in Paris. A still larger proportion of the capital of the tramways and narrow-gage lines throughout the country is foreign. While there are some fairly good lines in Spain, as, for example, those in particular connecting Madrid with Paris and Barcelona with Madrid, the lines upon the whole are badly constructed and poorly and indifferently operated. The foreign capital, however, takes fairly good care of itself, the operation being generally profitable.

On the other hand, the commerce and industry of the country are crippled by the insufficiency and inefficiency of the railway system. Much additional mileage is needed to bring Spain up to the average of other countries in western Europe.—*Charles F. Beach and Henri Segnitz, in Moody's Magazine.*

TOOLS AND SUPPLIES FOR CABIN CARS.

The list of tools and supplies for cabin cars given herewith is taken from circular No. 98, issued by the motive power department of the Pennsylvania Railroad. From this list the division superintendents must prepare and issue a division general notice, approved by the superintendent of motive power, specifying only such tools and supplies as are required for cabin cars in service on their respective divisions. When local conditions require articles other than those specified on this list their use must be authorized by the general superintendent motive power. This list does not include hand lamps, flags and C. T. stationery charged directly to trainmen.

Basin—Wash	*1	Hose—Back-up, Complete	1
Board—Transfer	1	Hooks—Packing	2
Bolts, Nuts and Clevises	†..	Irons—Sponging	2
Box—First Aid	1	Knuckles—Coupler, assorted	5
Box—For Tripoli	1	Knuckles—Emergency	2
Broom	1	Knuckle—Pin, large	1
Brush—Scrubbing	1	Knuckle—Pin, small	1
Buckets—Large	2	Lamps—Cabin (bracket)	1
" —Small	1	" —Deck	1
" —Sponging	2	" —Rear End Market	2
Burner—Deck Lamp	1	" —Hand, Red	1
" —Hand Lamp	1	Lye	1 lb.
" —Marker Lamp	1	Matches—Boxes	1
Cans—Oil, 1-gal. or 2-gal.	2	M. P. 276	6
Chains—		M. P. 277	6
Long, with hook and link	1	M. P. 401—A	6
Short, with Two Hooks	2	M. P. 183	6
Chisel—12-in.	1	Padlocks	*..
Cups—Drinking	4	Pinch Bar	1
Cushions—Long	3	Poker—Stove	1
Cushions—Short	4	Replacers—Car (pair)	1
Flags—Green	2	Shovel—Fire	1
Flags—Red	2	Soap—Pieces	2
Flag Holders	2	Torpedoes	24
Fusees	12	Truck—Transfer	1
Gaskets—Air-brake coupler, 1¼-in.	6	Tripoli	½ lb.
Globes—Hand Lamp—Red	1	Waste—Cotton	½ lb.
Globes—Hand Lamp—White	1	Wicks—Deck Lamp	1
Hammer	1	" —Hand Lamp	3
Hose—Air-brake	3	" —Marker Lamp	2
		Wrench—18-in. Stillson	1

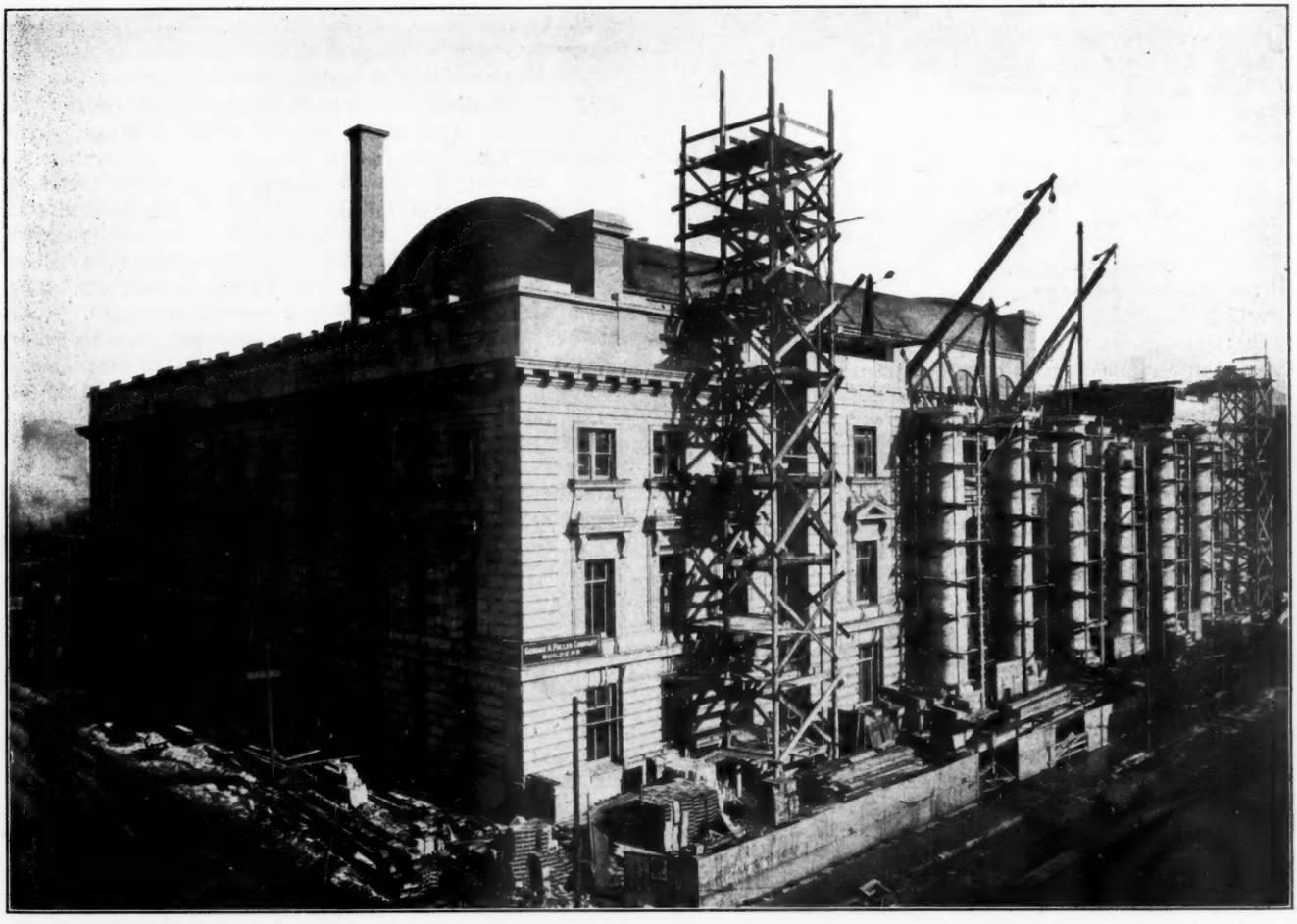
* Furnished when required and where no other style is provided.
†A limited asortment of these articles will be permitted.

CHICAGO & NORTH WESTERN TERMINAL.

The accompanying photographs, taken for the *Railway Age Gazette* February 3, show progress on the new Chicago & North Western terminal station at Chicago. This will be one of the great terminals of the West, when completed.

Approach, Looking South; Chicago & North Western Passenger Station.

Approach, Looking North; Chicago & North Western Passenger Station.



Appearance of Station on February 3.

FAST FREIGHT LINES.

BY G. G. HUEBNER, PH.D.[1]

THROUGH SERVICE PRIOR TO THEIR ORGANIZATION.

One of the most urgent problems of the early railway companies and shippers was the rapid handling of through traffic. There was, in fact, no "through traffic" as it is known at present. The railway net work consisted of a large number of small independent carriers, each of which confined itself to the handling of freight from one point to another on its own line. On shipping freight to distant points each link in the route of independent lines became a separate receiving company. They took receipts[2] from each other on delivery to each other. Bills of lading were as a rule issued only to the end of the individual railways. In a few exceptional cases through bills were issued but they were so "hedged in and surrounded by limitations as to the liability of each railway"[3] that in the event of loss, damage or overcharge the shipper was obliged to seek redress from the particular line on which the offense was committed. Cars, moreover, both because of the danger of not having them returned and because of the difference in track gage were not interchanged, and cargoes were transferred from car to car at the end of each separate line.

The difficulty and delay involved in the handling of through freight soon resulted in the organization of numerous "forwarding firms." Such, for instance, were the early firms of Leech & Company, Clark & Company, Borbridge & Company and many others. These firms had agencies at the points where freight was transferred from car to car and at the principal cities. They made special arrangements with railways, canals, steamboat companies and wagon lines so as to get continuous routes between distant points. They contracted for through rates and frequently, as distinct from the railways, issued through bills of lading. They saw that their customers' freight was taken from consignor to consignee over the myriad of transportation lines, and the shipper paid them a stipulated price for the service. Some of them were commission merchants as well as forwarders, receiving produce, forwarding it to markets and selling it on commission.

The service rendered by these firms was usually efficient and they did much to facilitate through shipments. But it soon appeared that in spite of anything they might do to facilitate business arrangements there could be no solution of the through freight problem unless cars were carried from consignor to consignee without breaking bulk at the end of each receiving railway. Not only did the carriers refuse to have their equipment pass beyond their lines, but the difference in gage made it impossible for the prevailing type of car to do so.

RISE AND ORGANIZATION OF PRIVATE FAST FREIGHT LINES.

To diminish the delay and damage resulting from transshipment of goods through routing became a public necessity. As a result separate and independent car companies known as *fast freight lines* were organized to handle through traffic. These companies made contracts with the carriers so as to obtain a continuous line between distant points, and they had their own cars. Many of their cars were equipped with adjustable trucks or wide flange wheels so as to be suited to different gages.[4] The first private fast freight line was Kassan's[5] Despatch, organized in 1855 or 1856; the Great Western Despatch was organized in 1857; the Western Insurance & Transportation Co. (Star Union Line) was incorporated in 1856 and organized in 1863; and many others followed.

The organization and working of the Star Union Line may be regarded as typical. In 1856 it was incorporated as the Western Insurance & Transportation Company, and in 1863 was organized as the Union Insurance & Transportation Company. The well-known ⊛ "Union Line" was adopted as its name. It purchased 55 cars from the little Miami Railroad and handled its first freight in February, 1864. Not only did it provide a through route between the east and middle west, but it insured the time of goods in transit. An additional 25 cents per 100 lbs. on dry goods, for instance, was charged between Chicago and New York to insure five days' transit. Difficulties arising from this practice and from the claim that the insurance covered also the safety of the freight resulted in the abolition of the insurance feature in 1865, and a change in the company's name to "Union Railroad & Transportation Company."

Aside from the ownership of cars, the nature of the line is seen in its varied activities. It established car floats between Jersey City and New York in 1866; it had its corps of freight solicitors at appropriate points to induce shippers to ship their freight in Union Line cars and to take charge of the shipments, and it carried mail for the federal government. Gradually, however, the Pennsylvania Railroad Company acquired control of the roads over which the Star Union Line operated and the Pennsylvania Company was organized to manage the western lines. As a result there was no longer any need for a private fast freight line to handle through business, and the Pennsylvania Railroad served notice that the contracts would be terminated. Thereupon the Star Union Line offered to sell all its properties, good will and rights to the Pennsylvania Company. The transfer was made in 1873 for 60,000 shares of common stock of the Pennsylvania Company and the Star Union Line as a distinct freight company ceased to exist, although the line has been perpetuated and continues its functions as the recognized through freight line of the Pennsylvania Railroad system between the east and the west.

The Empire Transportation Company known as the ⇐ Empire Line, is another typical fast freight line which in its early stages was a private company. This company was particularly interesting as regards its varied activities. It was organized in [1]1865 primarily to develop the traffic over the Philadelphia & Erie Railroad. It, however, made contracts with other carriers and soon obtained a through route from New York to Chicago.[2] To handle the oil traffic in and around Oil City it organized the "Green Line" to operate its tank cars. It also acquired various oil pipe lines soon after that method of transportation proved feasible. In 1866 it purchased a controlling interest in the Titusville Pipe Company, in 1872 purchased the entire property of the Mutual Pipe Line Company and of the Union Pipe Company, in 1873 it constructed the Butler Pipe Line, and in 1875 the Olean Pipe Line. At the time the Empire Transportation Company was purchased by the Pennsylvania Railroad it operated over 400 miles of pipe.

The Empire Line moreover constructed extensive terminal facilities to handle its traffic; it operated river floats at New York and a number of grain elevators at its seaboard terminals. To extend its service on the Great Lakes it organized the Erie & Western Transportation Company, commonly spoken of as the ⚓ "Anchor Line," and thus operated a fleet of freight and passenger steamers. As in the case of the Union Line, however, its work as an independent company was made unnecessary by the consolidation of railways and in 1877 it was purchased by the Pennsylvania Railroad.

The arrangements of the private fast freight lines with the railways were various and peculiar. The Union Line, for example, had a contract with the Pennsylvania Railroad pro-

[1]Instructor in Transportation and Commerce, Wharton School of Finance and Commerce, University of Pennsylvania.
[2]Hepburn Committee Investigation of N. Y. (1879), Vol. III., 2960.
[3]Ibid III. 2960.
[4]Report of Joint Special Committee to Investigate the Vermont Central R. R. management, p. 46.
[5]Hepburn Committee Report (1879) III, 2960; Weld, p. 76.

[1]"Theory and Practice of the American System of Through Fast Freight Transportation as Illustrated in the Operation of the Empire Transportation Co. (Philadelphia, 1876).
[2]N. B. Wilson, "History of Pennsylvania R. R. Co.," Vol. II. 66-68.

viding for a fixed sum per car. The freight rates were collected by the Union Line, while the railway regardless of lading received $72 per car between December 1 and May 1 for hauling them to Philadelphia and Baltimore. During the remainder of the year these payments were $56 and $45 respectively. Likewise from New York to Pittsburgh between December 1 and May 1 the Union Line paid $110 per car and from Philadelphia and Baltimore $85, while during the remainder of the year the payments to Pittsburgh were $100 and $75 respectively. West of Pittsburgh there was a different arrangement. Here a percentage arrangement prevailed, fixing the payments for certain weights on the basis of a total weight of 16,000 lbs. The freight line received the difference between the payments it made to the railways and the freight charges it collected, but also received mileage from the railways at the rate of 2 cents per mile.

Omitting exceptional contracts, the financial arrangements between the private freight lines and railways passed through two[1] stages. In the first the prevailing method was that a fixed sum per car hauled was paid by the freight line to the carrier, while the freight line received the freight charges from the shipper and a mileage charge from the carrier. In the second stage the freight line made no payment to the railway but was paid in various ways for the use of its cars and the solicitation of business. The principal method of payment was a percentage of the freight rate and the lines came to be known as "commission lines." On westward traffic the commissions ranged from 15 per cent. on the first three classes of freight, 10 per cent. on the fourth class and 8 per cent. on specials, down to 10 per cent. on the first three classes and 5 per cent. on the fourth class and specials. On eastbound traffic they usually were 12 per cent. on the first three classes, 10 per cent. on the fourth class and 8 per cent. on specials. Other roads settled on a mileage basis. The Vermont Central, for example, and all other lines over which the "National Despatch" operated, except the Michigan Central[2] paid to this line a mileage of first three and then two and one-half cents per car-mile.[3] Still others paid the freight lines a fixed per diem allowance. The United States Rolling Stock Company, for instance, received 75 cents per day for 300 days per year and repairs were made by the carriers.

While many of these early private freight lines fulfilled a much needed service complaint arose that in some instances they unduly diverted profits from the stockholders of the railways. The bitterest opposition appeared in the case of those freight lines whose stockholders consisted largely of railway officials. In the case of the National Car Company or "National Despatch" and the Vermont Iron & Car Company, for example, it was admitted[4] that their stocks were largely held by officials of the Vermont Central, Vermont & Canada, Grand Trunk, Boston & Lowell and other railways. At times the cars of these freight lines were given preference over those of the Vermont Central. Their cars were built in the car works of the Vermont Central, some of them but little more than the cost of construction. The National Car Company[5] paid first 10 per cent. and then 12 per cent. dividends on the par value of its stock and the Vermont[6] Iron & Car Company paid 10 per cent., while the Vermont Central Railroad was in the hands of a receiver.

Partly because of such abuses, but more generally because the consolidation of the railways into extensive systems made an independent freight line unnecessary, the movement on the part of the railways to purchase them gained ground so rapidly that by 1875 they had almost entirely disappeared.[7]

[1]Windom Committee report (1874), II, 361-2; Hepburn Committee Report (1879), III. 2961-2.
[2]Michigan Central paid two cents.
[3]Special Investigation of Vermont Central, etc., p. 46.
[4]Special Investigation of Vermont Central, etc., pp. 7, 76, 93, 117, 126, 128, etc.
[5]Ibid, p. 89.
[6]Ibid, p. 119.
[7]Weld, p. 77; Ringwalt, Development of Transportation Systems in the United States, p. 192.

PRESENT DAY FREIGHT LINES.

The rapid disappearance of the private fast freight companies was the signal for new forms of freight lines. There are at present two general types, first the co-operative and second the company fast freight line. The co-operative lines made their appearance even before the private lines had largely disappeared. Such, for instance, were the early lines known as the "Purple Line," "Orange Line," "Planet Line," Blue, Red or White lines. The usual arrangement was and still is for each road interested to contribute a portion of the equipment, and the total earnings are pro-rated between the members just as in the case of interline freight shipped without the medium of co-operation freight lines. A board of managers consisting of an official from each railway interested selects a general manager and his assistants. Agents are then located at the leading terminals to solicit business, and all they succeed in getting is consigned over the particular route represented by the co-operative line. The only cost to the participating carriers is the actual expense involved; the entire profit goes to them just as though no freight line had been organized. Co-operative freight lines, in fact, have no earnings separate from those of the carriers interested. A contract[1] with such a line means a contract with the parent railways. Co-operative lines are merely through routes so organized as to consign interline traffic over the railways interested. Typical examples of the present time are the White Line, Traders' Despatch, Lackawanna-Grand Trunk, Lehigh and Wabash Despatch and various others.

With the further consolidation of the railways even the co-operative lines have lost ground. But instead of wholly abandoning the fast freight line, *company freight lines* have in many instances been organized. There are in general two subtypes of company freight lines, those which really consist of little more than departments or bureaus of a railway, and those which are companies owned by the carrier but with separate identity. In a sense many of these freight lines are also co-operative, but they differ from the purely co-operative lines in that wherever more than one railway is interested the railways are affiliated so as to really constitute a single large system.

Of the former type of company freight lines numerous illustrations may be cited, and their organization is not always identical. The Star Union Line, for instance, is still co-operative in the sense that the Pennsylvania lines east and west of Pittsburgh are interested. But when in 1873 it was purchased by the Pennsylvania Company it lost its separate identity and became a sort of bureau or agency with few expenses and no earnings of its own. Its fluctuations are few as compared with what they were when it was a private line. It is an accounting[2] bureau for through freight; its auditor audits the accounts of through freights for the Pennsylvania Lines. He is practically the manager of a clearing house supervised by a board of control which consists of himself and the comptrollers of the Pennsylvania lines east and west of Pittsburgh. In addition to this the concern has, however, not entirely lost its functions as a freight line. It has agents located at different points to solicit traffic. Such agents are directed by the manager and superintendents of the Union Line, but are in reality employees of the Pennsylvania system. The soliciting is done through the Union Line, for to the shipper that represents a definite through route. It acts as a trade mark, the use of which tells the shipper exactly how his goods will be routed. A certain good will, likewise, is attached to it as to any well established trade mark.

The Pacific Fruit Express Company is another company freight line of this general type but is organized in a somewhat different manner. It is a corporation and was formed in 1906 by the Harriman Lines for the definite purpose of

[1]Windom Committee Report, II. p. 128.
[2]A. C. Wright, General Freight Agent, "Freight Solicitation." Y. M. C. A. Transportation Lectures, 1905-6; etc.

handling the fruit business. It is spoken of as a refrigerator line but is in reality but a separate department[1] of the Union Pacific. The 6,600 refrigerator cars which the Harriman Lines ordered in 1906 were turned over to this department instead of to the traffic department. The reasons for the formation of a separate company were that the traffic department, it was thought, could not devote sufficient time to the necessary special service and study required in the movement of fruit, and that an extra corps of men is needed to ice the cars, locate the icing stations and generally supervise the refrigerator service.

The Merchants' Despatch Transportation Company (M. D. T.) may be cited as an example of the second form of company freight line. It is a separate company but its stock is owned by the New York[2] Central Lines. It owns about 6,000 cars, has agents[3] located at numerous large cities to solicit freight and sees to the icing of refrigerator cars billed under its care. Very similar to this is the American Refrigerator Transit Company (A. R. T.), which is a separate corporation but is subsidiary to the Wabash, St. Louis, Iron Mountain & Southern and the Missouri[4] Pacific railways. It owns 4,500 cars and operates them on these roads, solicits freight and ices its refrigerators. The Santa Fe[5] Refrigerator Despatch is also a company freight line, but is so closely subsidiary to the Atchison, Topeka & Santa Fe that it is sometimes regarded merely as a department of the railway. Instead of owning its equipment it leases about 6,000 refrigerator cars from the Atchison, paying 5 per cent. of their value annually for their use. Its earnings come from the refrigeration charges and the mileage which it receives from the foreign railways over which the cars are consigned.

It appears, therefore, that there are two general types of fast freight lines at the present time and numerous variations. They range everywhere from those which merely signify a through route to those which own equipment and operate as subsidiary corporations. It naturally follows that the financial arrangements between the freight lines and the railways are even more variable than the types of freight lines.

In the case of the co-operative lines it is chiefly a matter of pro-rating the earnings. The number of cars which each railway furnishes is first arranged, and then the members agree upon the portion of the through rate which each receives. The earnings never reach the freight line but are collected by the receiving or delivering railway and are pro-rated in the usual way. Whatever expenses are incurred by the freight line are likewise pro-rated between the interested carriers. The arrangement in the case of company lines which are merely bureaus or departments is similar, as they are frequently but co-operative arrangements between the affiliated roads of a great system.

The usual arrangement in the case of company freight lines which own cars is in the form of a contract with the controlling railways. Compensation is usually made in the form of mileage and the payment of a commission[6] on the freight rate. This type of organization is, in fact, sometimes still called a "Commission Line." The contract of the Santa Fe Refrigerator Despatch is peculiar in that the freight line receives neither mileage nor commission from the parent road. It pays to the railway 5 per cent. of the value of the cars which it has leased and pays[7] for all the repairs, expenses of operation and other expenses out of the earnings from the icing service and the mileage paid by foreign roads.

The financial arrangements with foreign railways over which the freight line cars are consigned are as yet unsettled. All such cars are really railway equipment and yet the code of per diem rules is not in every case applied to them. The Santa Fe Refrigerator Despatch, Merchants Despatch and American Refrigerator Transit Company collect mileage from foreign roads in the same way that private car companies do. The A. R. T., moreover,[1] in some instances receives commissions of 12½ or 10 per cent. of the freight rate from foreign carriers. Some of the eastern roads such as the Pennsylvania,[2] Erie and Baltimore & Ohio, have applied an optional rule. They have given their connecting lines the choice of paying either per diem or mileage on the refrigerator cars according as in each instance they find the one or the other cheaper.

In conclusion it may be noted that the term "fast freight line" is in most cases misleading. Some of the lines are refrigerator companies and in reality handle fast freight, but fast freight lines should be distinguished from the fast freight arangements which the railways are making to handle high class and perishable goods. They usually constitute through routes and received their popular name in the early sixties, when the lack of through routes was the greatest hindrance to rapid transportation. Their functions as freight solicitors, trade marks, accounting bureaus, and in some cases as car owners and refrigeration agencies are likewise foreign to any idea of "fast freight." A fast freight line may handle grain, hay, lumber or any other freight that habitually is not carried on fast trains or schedule time.

It is in the region tributary to the Atlantic coast ports that the fast freight lines are most numerous. In 1905[3] as many as 84 furnished through routes from the west and south to these ports. Their number is due chiefly to the fact that through shipments to these ports from the west or south must usually pass over several different carriers. The Atlantic ports, moreover, lead in the export business, and many of the fast freight lines act as special agencies to furnish through routes to foreign[4] destinations. Relatively few freight lines terminate at either the Gulf or Pacific coast ports. While movements here frequently involve more than one carrier they have not been sufficiently complicated to result in a host of fast freight lines. It is significant that when the Atchison and Harriman Lines took over the fruit refrigeration service, they immediately organized freight lines similar to some of those found in eastern territory.

[1]Weld, p. 29.
[2]I. C. C. hearings, (1904), p. 137.
[3]Ibid, p. 139.
[4]Ibid, p. 143; Weld, p. 30; Elkins Committee hearings, III, 2278.
[5]I. C. C. hearings (1904), p. 145; Weld, p. 148.
[6]I. C. C. hearings (1904), p. 144, etc.
[7]Weld, p. 148; I. C. C. hearings (1904), p. 145.

[1]I. C. C. hearings (1904), p. 104.
[2]Weld, p. 89.
[3]List of Through Fast Freight Lines operating from Eastern Port Cities to Western and Southern States with names of railways and steamships over which such lines operate.—Penn. Railroad (F. D. No. 174, Record File 775).
[4]See "Methods and Routes for Exporting Farms Products." U. S. Department of Agriculture, Bureau of Statistics, Bulletin No. 29 (1904) for list of fast freight lines handling merchandise for foreign delivery.

FOREIGN RAILWAY NOTES.

Very little coal is used on locomotives in Peru, oil, of which there is abundance, being found cheaper and better.

On the Finnish railways—all save a few short roads are state controlled—the brakemen get 60 marks per month and the engineers 200 marks. (A mark equals 19 cents.)

In Peru there are 2,242 km. of railway in actual operation, 747.6 in construction and 3,010 projected. Of the road in operation 1,544 kms. are state-owned road leased for 56 years to the Peruvian corporation.

Work was vigorously pushed on the Yalu river bridge of the Antung-Mukden line last summer, seven of the 18 piers being almost completed. The bridge is to accommodate a railway track, a footpath and a driveway. It will require more than another full year to complete it at a cost of $1,500,000 gold, but the plan is to have the bridge built by the time the longest tunnel of the railway is completed. The road will probably be open for traffic by January 1, 1911.

General News Section.

In New York last week the Interstate Commerce Commission took testimony on the complaint of B. E. Sundberg, of Kennedy, Minn., that the four large express companies have an agreement to keep up prices.

The government of Chile, South America, has adopted as the standard time of the country that of the seventy-fifth meridian west of Greenwich, the same as Eastern time in North America.

Mr. and Mrs. T. Rice Smith, who have lately retired from duty in the ticket office of the Wabash Railroad at Jacksonville, Ill., had together served the Wabash and its predecessors 108 years. Mr. Smith began with the Sangamon & Morgan on April 1, 1850, and Mrs. Smith began in 1860. Mr. Smith has now been appointed city passenger agent at Jacksonville.

Five miles from Pittsburg, Kan., on the night of February 5, the passengers on a train of the Missouri Pacific were robbed by three men who "held them up" while the train was in motion, and without putting on masks. It is said that they took about $400 in money as well as some jewelry. The men left the train at Cornell and rode away quickly into the hills.

The officers of the Southern Pacific are considering the expediency of raising the grade of the approaches to the trestle across Great Salt Lake and of the embankments, which have settled somewhat since they were originally grated, and which were originally built to a grade level 5 ft. below that of the trestle. To some extent the consideration of these changes is suggested by the fact that the water in the Great Salt Lake recently has been rising. It is not true, as has been reported, that the question of raising the trestle itself is under consideration.

According to a press despatch from Trenton, N. J., the Pennsylvania Railroad is offering for sale in that region real estate aggregating in value more than $100,000. The property consists of lands and houses which were bought in connection with the straightening and widening of the road several years ago, the company having been compelled in many cases to buy larger tracts than were actually needed. The property was bought through a real estate company, and therefore can be sold without affecting the rights of the holders of the railroad company's mortgage bonds.

Train despatching is now done by telephone on the main line of the Lehigh Valley between Easton and Penn Haven Junction. Plans to extend the system still further are already made, and will soon be carried out. The amount expended in equipping this line and the Mahanoy and Hazleton division with telephones was about $30,000. The numbers of trains and engines and the names of stations must first be pronounced distinctly and then spelled out in full. Since the installation of telephone service on the Mahanoy and Hazleton division, December 6, there has not been a single failure among the 36 selectors on that division.

The Michigan Demurrage Bureau has decided to adopt the new national demurrage rules, notwithstanding the action of the railway commission of that State, looking to the establishment of a different code, because of the belief, on the part of the commissioners, that the national code will not work for the interests of the State. The Interstate Commerce Commission, announcing this news from Michigan, says that the national rules will probably be put into effect also at Pittsburgh, Pa. With Michigan and Pittsburgh in line, the New England States will be the only part of the country where the uniform rules will not be in effect.

The insurance department of the Pennsylvania Railroad system reports that during 1909 the company's employees extinguished 321 fires, the loss from which amounted to only $20,000. The company's organization for fighting fires has been further developed by training of employees, and additional yard locomotives have been equipped with apparatus for use in case of fire. During the year there were 929 fires on the entire system, east and west of Pittsburg, involving a loss of only $402,615, which was comparatively small, as the value of the property was more than $260,000,000. Forty fires, entailing a loss of $11,079, started on adjacent property.

A New York railway man, speaking of the efforts now being made to fix the responsibility for higher prices, calls attention to the fact that the railways have not in any way been responsible for the increase in the cost of living. They have been the victims of high prices without benefiting from them at all. If beef or pork or flour or any other commodity costs more now than it cost ten years ago not the fraction of a cent of the increase can be charged to transportation. The statistics of the Interstate Commerce Commission show that the level of freight rates has declined steadily. In 1897 it cost a little less than four-fifths of a cent to ship a ton of freight one mile; eleven years later, in 1908, the ton-mile rate was still lower, being about three-quarters of a cent. Bradstreet's index numbers for 96 commodities show that the increase in the prices of these commodities, on the average, from January 1, 1890, to January 1, 1909, was 21.4 per cent. If freight rates had increased during the same period at this ratio the gross freight receipts for the year ended June 30, 1908, would have been $243,536,407 greater than they actually were. This sum represents what was saved to the public in transportation costs by reason of the price of transportation not advancing along with other prices, and, while rates have declined, everything that a railway buys has advanced.

State's Attorney Will Not Act in Western Indiana Case.

John E. W. Wayman, state's attorney of Cook county, Illinois, has announced that he will not proceed criminally against Benjamin Thomas, John C. Fetzer and Charles R. Capps for alleged real estate frauds on the Chicago & Western Indiana (See *Railway Age Gazette*, January 28, page 197) unless someone representing the Western Indiana will sign and swear to the complaint in the municipal court. Walter L. Fisher, counsel for the railway, made a statement in reply in which he said that the management would continue to push the case against Messrs. Thomas, Fetzer and Capps, but he could not say as to just what method would be pursued. He added that the fact that Mr. Wayman had called so many witnesses in other cases would make it impossible for the road to go before the January grand jury, which had only three more days to sit.

A story was put in circulation to the effect that the money of which it was alleged that the railway had been defrauded had been used to get a bill through the last legislature validating a bond issue of $50,000,000. This story was ridiculed by the directors of the road, who said that they would hardly have instituted civil suit against Messrs. Thomas, Fetzer and Capps if they themselves had illegitimately applied the road's funds.

R. H. Aishton, general manager of the Chicago & North Western, has been elected also chairman of the General Managers' Association. Mr. Aishton, unlike his predecessor, will serve without pay. Mr. Thomas having retired, the Wabash, the Erie and the Chicago Great Western have now renewed their membership in the association.

Headlight Question Goes to the Courts.

The Indiana Railroad Commission heard argument last week by railway attorneys for a modification of the order requiring brilliant headlights on locomotives, but the order stands.

The railways will contest the order in the courts. They will attack the constitutionality of the clause making the commission the judge of the efficiency and practicability of a light. The Baltimore & Ohio has already filed suit in the

Federal Court to enjoin the enforcement of the order. It is declared that the use of headlights such as are recommended by the commission would place the enginemen in danger of mis-reading signal lights. The road's business is largely of an interstate nature, and the Congress of the United States is the only body which has the right to regulate such matters. It is further alleged that to carry out the order of the commission would entail an expenditure of about $20,000, and that unless the commission is restrained the company will be subjected to a multiplicity of penalties.

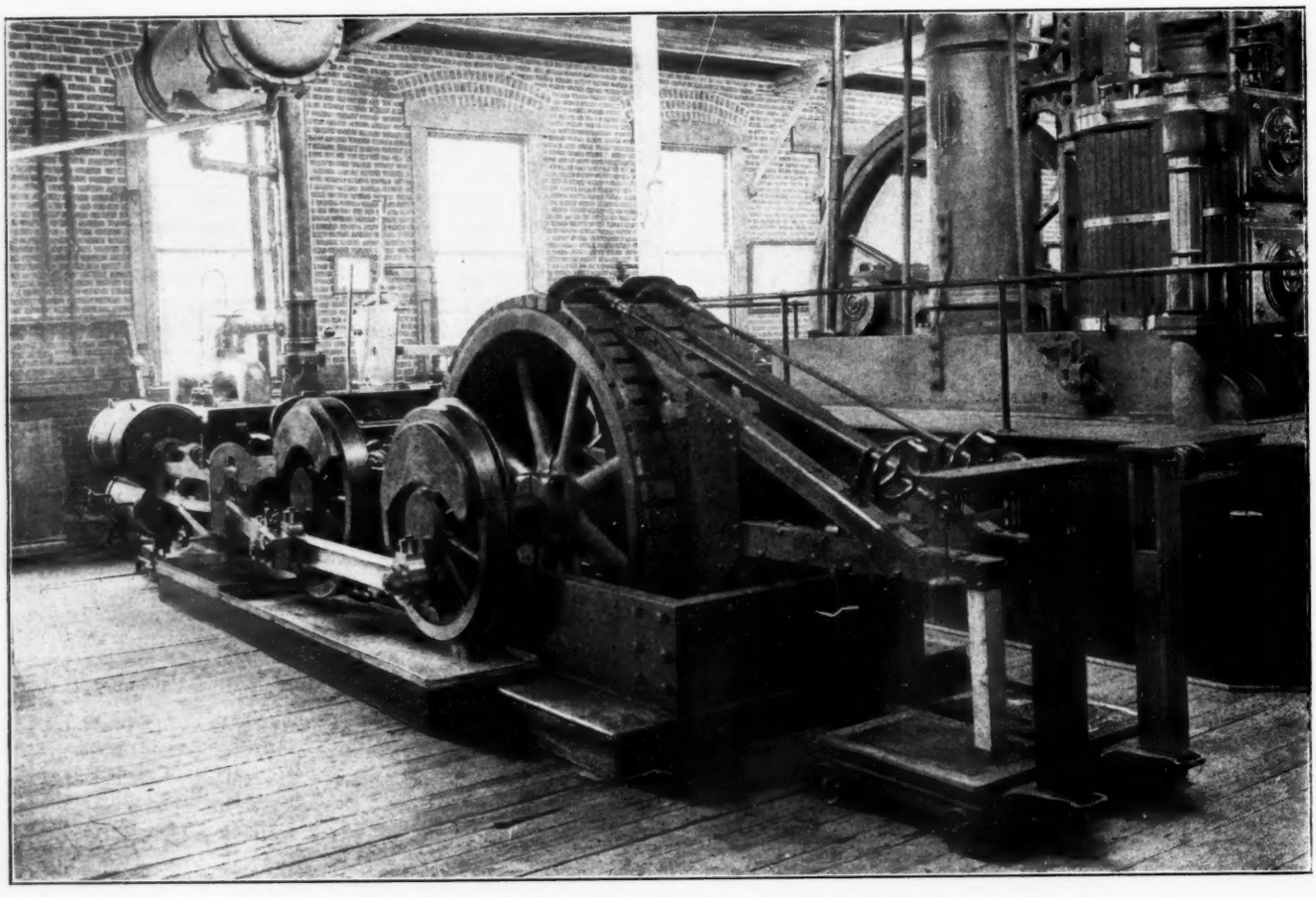
Remodeled Vauclain Compound Running Gear at Purdue University.

In 1894 the Baldwin Locomotive Works presented to Purdue University the frame and running gear of a Vauclain compound locomotive. The equipment included everything necessary for running the engine with but one pair of drivers. The lack of room between the driving axle and the frame made it impracticable to use a brake of sufficient size and capacity to absorb the power of the engine.

Through the generosity of the American Locomotive Company and the kindly interest of Vice-President Ball, in 1908 an additional pair of drivers, together with suitable boxes and side rods, was presented to the university for the purpose of extending and completing the equipment. The frame has been extended so as to accommodate the boxes for the additional axle and the old frame stiffened by bracing and by its connection with the concrete foundation adapted for the transmission of the full power of the engine. On the supplementary axle two cast-iron pulleys 6 ft. in diameter by 14-in. face have been mounted. These are fitted with internal flanges to hold water, and two Prony brakes of exceptional size and strength, with wooden rubbing blocks and weighing lever. When running backward ordinary platform scales will receive the load, and when running forward calibrated springs will prevent the lever from rising. This brake is designed to take care of 500 or 600 h.p. under ordinary running conditions, with a possible miximum of 800 h.p. for a short time.

Thus equipped, the locomotive will be a valuable piece of apparatus for students of railway engineering. Being of the four-cylinder compound type, it gives a good opportunity for a study of the steam conditions and distribution under various loads.

The possession of this piece of apparatus, in addition to the Schenectady No. 3, which is mounted on friction wheels in the locomotive laboratory, gives the student of railway engineering a particularly good equipment for the study of locomotive problems. It is expected that some interesting research work will be done with this engine during the coming year.



Remodeled Vauclain Compound Running Gear at Purdue University.

Railway Matters in Washington.

Washington, Feb. 9, 1910.

Senator Newlands, of Nevada, who some time ago presented a bill in Congress to provide for incorporation of railways by the federal government, has asked the committee on interstate commerce to give a hearing on his bill. The bill proposed by President Taft deals mainly with industrial corporations, while Senator Newlands proposes to have his bill confined to common carriers. The President's bill was introduced in Congress on Monday. It is expected to meet with severe criticism and prolonged discussion in committee.

The Senate Committee in its hearings on the Elkins and Townsend bills to amend the Interstate Commerce law has listened to J. C. Lincoln, of St. Louis, agent of the National Industrial Traffic League, and R. C. Butler, of Chicago, representing a number of mercantile associations. Mr. Lincoln, in addition to arguments which he has presented before, proposed an amendment to make the proposed laws applicable to express companies as well as to railway companies. Mr. Butler desired modifications in those clauses of the proposed law

which will establish an Interstate Commerce court. He thought that applications for injunctions should be heard by three judges, and wanted to make clearer the provision allowing a shipper to appeal to the proposed court from an order of the Interstate Commerce Commission. H. G. Wilson, of the Kansas City Commercial Club, presented an argument in favor of the clause in the proposed law which gives the shipper the right to route his freight.

Senator Overman, of North Carolina, on Monday introduced a joint resolution to postpone the enforcement of the corporation tax law, with a view to relieving corporations from the payment of taxes until the validity of the law shall have been passed upon by the Supreme Court of the United States.

Attorney General Wickersham is making further changes in the Administration's railway bill. He has changed it many times already, but he is supposed to be trying now to meet certain criticisms of members of the Senate Committee. This committee will probably hold further hearings this week.

Secretary Ballinger, of the Interior Department, has issued instructions to throw open 1,400,000 acres of land in eastern Montana to white settlers. This land was withdrawn about two years ago with the expectation that it would be allotted to Indians. This land is very fertile. It will be opened under the usual homestead laws, instead of the lottery system. Settlers may go on the land any time after March 1 and may make entry at the Glasgow (Mont.) land office March 31 and thereafter. The Great Northern has issued folders with maps showing the location of the lands. There are over 8,000 160-acre homesteads in this tract, which is considerably more than the combined total in the Flathead, Spokane and Coeur d'Alene reservations, which were opened to settlement last summer.

At a meeting in this city last week representatives of a number of coastwise water transportation companies discussed the proposition to extend the powers of the Interstate Commerce Commission over steamship lines. A pamphlet was circulated showing how the growth of the merchant marine in the coastwise trade might be severely checked if hampered by a law like that which binds the railways. Tramp steamers probably could not be controlled and they could kill much of the business of the regular lines.

Legibility of Shipping Orders and Expense Bills.

Arthur Young & Co., certified public accountants, endorsing the work of the freight traffic committee of the Chicago Association of Commerce, says: "For years we have advocated to our clients the maximum of legibility of these matters. A fair degree of success has already followed the efforts of the carriers in large shipping centers to persuade shippers to use writing machines in making bills of lading, etc. It is to the credit of the carriers that they have taken a wholesome dose of their own medicine, and are increasing the use of writing machines. This applies to express companies also.."

Conductor and Engineman Acquitted.

At Newton, N. J., last week, F. E. Vance and Thomas O'Neill, engineer and conductor of a freight train on the Lehigh & Hudson, were acquitted of the charge of manslaughter, on which they had been tried, before a court and jury, in connection with a collision which occurred January 6 at Woodruff's Gap, causing the death of a fireman. The jury deliberated on the case all night. The press despatches indicate that the acquittal was due to the feeling on the part of the jurymen that the men had been required by the railway company to work excessively long hours without rest. It appears that the two men, in charge of a freight, started from a side track, where they had been waiting, when the second of two trains which they were ordered to keep out of the way of, had not arrived. The forward brakeman set the switch for the freight to pass from the side track to the main line, and the engineman carelessly acted on the brakeman's hand signal. As to the overwork, it appears from the testimony of the engineman that he went on duty about 5 p. m., January 5. After reaching the end of this trip, some time in the evening, he lay down to sleep in the caboose of his train, but, in consequence of the noise of passing cars, he slept only a few minutes at a time, until, at 2 a. m., he and the other members of the crew were called out by mistake. Thereafter he was unable to rest, and at 5 a. m. he had to begin his return trip. He was then on duty until the time of the collision, about noon. This was more than 19 hours from the time that he had left his home. The counsel for the defendants alleged at the trial that the railway company knew the men were working without sufficient rest, yet neglected to relieve them. The engineman, in his testimony, said that he could not explain how he came to start his train out from the side track, except on the supposition that his mind must have been a blank, because of the long hours he had been at work.

Massachusetts Still in the Lead.

There is one matter of real importance that I want to call to your attention, a very remarkable statement, I think. It is a tremendous tribute to the capacity and ability of the men who handle the great railways in this section of the country. It is this: Taking 10 years from 1898 to 1907 inclusive, and taking the average of deaths of passengers without their own fault on our railways in Massachusetts for those 10 years, if you should take up your abode on a train, never getting off of it night or day, and travel at the rate of 250,000 miles a year, the equivalent of about 10 times around the earth, or about 20,833 miles a month, or about 29 miles an hour, if you had average luck you would not be killed oftener than once in 2,039 years. (Laughter and applause). You may think that is funny, but it strikes me as being a mighty consoling proposition.—*Governor E. S. Draper*, before New England Railway Club, Boston.

New York Central Automatic Signals.

In addition to the "Expert Views on Signaling," published last week, some strikingly positive statements were made at the Public Service Commission's hearing on the Croton collision by Mr. Rudd, signal engineer of the Pennsylvania.

"I believe that the practice on the Hudson division of the New York Central, and I know the division pretty well, with the number of interlockings they have, is just about right the way that they have it now, with the three-position upper quadrant automatic signal."

Q. Then in your opinion the New York Central has done everything that could be reasonably expected in the installation of this new signal system to secure safety; is that right?

A. Yes, sir. * * * We have installed the three-position upper quadrant system at Washington and at Broad Street Station, Philadelphia.

Q. Enginemen like it over there, do they?

A. They protested against the installation when it was put in and the general manager asked them to give it a trial before they decided against it; and a poll a short time ago was 143 for and one against; so it seems to be popular.

Q. What are you going to do to guard against mistakes of the engineman? What is the best you ever observed in practical use? Put yourself right in the position of the engineman who is looking out, who is careful, but who has to look at his engine, look at a variety of things, and, if by any accident he misses a single order, what is the very best thing?

A. I believe frankly that the system that the New York Central is just installing is the best system.

"The Value of Courtesy."

The educational bureau of the Union Pacific, of which D. C. Buell is chief, has issued a pamphlet entitled, "The Value of Courtesy," which is being distributed among the students of the bureau and also among passenger train employees and station and ticket agents. The pamphlet very strongly enjoins on all employes the need for treating patrons of the company with the most thoughtful consideration. It says in part:

"Questions must be answered carefully and correctly, and with a cheerfulness that does not repel nor discourage the questioner. They may seem irritational, or even silly; it must be remembered, however, that the railway, with its

complex and changing rules and schedules, is, to a greater or less extent, a mystery to some eighty millions of people—even the experts are put to their wits' end to avoid mistakes or misunderstandings.

"A kind word to those in the waiting-rooms who may be too timid to ask questions, shows thoughtfulness, and is received with appreciation. Courtesy of this kind is seldom vouchsafed, and when such interest is not manifested the impression may be given that the company's representative is taciturn and sour, although the contrary may be the case. The agent is looked upon as the company itself. He has the right to know that patrons are satisfied, and no offense can be given or taken through a polite inquiry as to whether anything can be done to assist the traveler. With the waiting-room full of people, a few minutes spent among its occupants in this way may bring many dollars to the company in return.

"On the train the conductor has many opportunities to increase the value of his services with a little personal effort that costs him nothing, and wins smiles of approval that are certainly more desirable than frowns of disapproval or sneers of contempt. Many very prominent and learned men have been flattered by a word of recognition from the conductor; in what esteem, then, must his affability be held by those of less importance or fewer attainments?"

The Railway Labor Situation.

On February 2 the general managers' committee, which has been negotiating with the representatives of the Brotherhood of Firemen at Chicago, refused to grant certain demands for changes in conditions of employment and advances in wages, and negotiations were terminated. On February 5 negotiations between the general managers and representatives of the Brotherhood of Railway Trainmen were similarly terminated This has created a railway labor situation in the West which cannot be regarded as serious, but which, nevertheless, is of considerable interest and importance.

The demands of the Switchmen's Union of North America presented last September in the Northwest were for changes in conditions of employment and also advances in wages which, in the aggregate, amounted to from 40 to 45 per cent. Failure to reach any agreement, and the precipitate action of President Hawley, of the Switchmen's Union, before mediation by the Erdman act could be resorted to, led to a strike by the switchmen of the Northwest. The railways have won this strike. Many of the men belonging to the union have gone back to work at Butte, Duluth, Seattle, Spokane and less important places. About 2,500 men struck. Of these about one-half have been re-employed, and the places of most of the rest have been filled.

The ill-success of this strike in the Northwest led the representatives of the Switchmen's Union in other parts of the country to act somewhat conservatively. After the strike in the Northwest, S. E. Heberling, vice-president of this union, made demands on the railways for switchmen working at Chicago, Buffalo, St. Louis and a number of other places similar to those which had been made in the Northwest. Conferences lasting about 30 days were held and as no agreement was reached the different committees representing the switchmen offered to arbitrate. This was about two weeks ago. The railways accepted the agreement. C. R. Gray, vice-president of the St. Louis & San Francisco, was appointed to represent the railways and Mr. Heberling to represent the switchmen. Messrs. Gray and Heberling have failed to agree upon a third arbitrator, and Chairman Knapp, of the Interstate Commerce Commission, and Labor Commissioner Neill have been asked, in accordance with the provisions of the Erdman Act, to appoint one.

After negotiations between representatives of the Switchmen's Union at Chicago and other points and of the railways began, the Brotherhood of Railway Trainmen, which includes large numbers of switchmen, also asked the railways for changes in their conditions of employment and advances in wages. Conferences were then begun with the representatives of this union, headed by F. A. Whitney, vice-president. Agreement was reached regarding 27 out of 40 of the proposed rules. Two of the proposed rules were withdrawn by representatives of the union. There was disagreement regarding the other 11. At the last conference on February 5 the representatives of the railways said that in the event an agreement was found impossible they desired to submit the differences between them and their employees to arbitration. A poll of the members of the Brotherhood is now in progress on the question of authorizing the committee headed by Mr. Whitney to determine whether the entire matter shall be submitted to arbitration or a strike shall be declared. The only roads directly concerned in the negotiations with the Brotherhood of Railway Trainment are 13 roads in the Chicago switching district. These are: The Santa Fe, Belt Railway, Baltimore & Ohio, Alton, St. Paul, North Western, Burlington, Chicago Junction, Erie, Monon, Indiana Harbor, Illinois Central and Wabash. The number of men involved is about 3,600. The situation in which Mr. Whitney and the union he represents find themselves is rather unusual. As stated, members of the Brotherhood of Railway Trainmen are switchmen. Now, the demands made by the Switchmen's Union are in a fair way to be arbitrated. A determination of their demands would naturally be reached before those of the Brotherhood of Railway Trainmen could be arbitrated. Consequently, if the Brotherhood of Railway Trainmen should decide to arbitrate it probably would be met with the statement by the government officials acting under the Erdman act that the questions it has raised have already been settled by the arbitration of the demands of the Switchmen's Union. As the switchmen in both unions often work in the same yards, it is out of the question to make two different settlements.

Before opening negotiations with the railways the Brotherhood of Firemen took a vote to determine whether their officers should represent them in the negotiations as a union or as the employees of individual railways. The members voted in favor of the latter. Negotiations, therefore, were first begun with the railways west of Chicago. About 20,000 firemen on 190,000 miles of railway are concerned. The employees demand an increase in wages of 22½ per cent. Agreement being impracticable, the railways offered to arbitrate. This proposition was refused and the question of authorizing officers of the union to declare a strike has been submitted to a vote of its members, the result of which will probably not be known before March 1.

The arbitration, under the Erdman act, of the differences between the Illinois Central and its telegraphers has come to an end. The result cannot be considered a victory for either side. If it is a victory at all, it is a victory for arbitration as provided for by the Erdman act. The telegraphers asked for a 10 per cent. increase in wages and also for reductions in working hours. The road would not grant the request. The employees then offered arbitration under the Erdman act, which was accepted. I. G. Rawn, president of the Monon, was selected to represent the Illinois Central, and John Newman, vice-president of the Order of Railroad Telegraphers, to represent the telegraphers. As they were unable to agree on the third member of the board, Chairman Knapp, of the Interstate Commerce Commission, and Labor Commissioner Neill, acting under the Erdman act, appointed B. H. Meyer, chairman of the Wisconsin Railway Commission. The award made by this board on February 7 denies the telegraphers the increase in wages asked for. It favors the granting of the following demands: Telegrapners at all offices on the system working 10 hours a day or more shall receive 15 days' leave of absence annually on full pay. The hours of all operators employed in train despatching offices shall be reduced from 10 to 9 hours a day without any reduction in their daily pay. The hours of work of operators employed in the three relay offices—at Chicago, Memphis and New Orleans—shall be reduced from 10 hours a day to 8 hours without any reduction in their daily pay. Telephone operators employed in train despatching service shall be placed on the same footing as telegraphers. A thousand men are affected.

Developments show a distinct disposition on the part of both the railways and their employees to resort to arbitration under the Erdman act when unable to reach an agreement. It will be noted that the railways offered arbitration to the trainmen, the firemen and the switchmen (at St. Paul); while the Switchmen's Union at other cities and the telegraphers on the Illinois Central offered arbitration to the railways. In both cases, where arbitration was tendered by the employees, the railways accepted it. The switchmen of the

Northwest agreed to arbitrate but repudiated their agreement. In view of the fact that the Erdman act was passed mainly at the instance of the railway brotherhoods, the circumstance that the railways have been more willing to resort to arbitration under it than their employees is perhaps not without significance.

Western Railway Club

At the meeting of the Western Railway Club at the Auditorium hotel in Chicago on the evening of February 15, E. T. Adams, manager of the gas and mill engine department of the Allis-Chalmers Company, will read a paper on the "Development of the Gas Engine."

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.; May 10-13; Indianapolis

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa.; June, 1910; Niagara Falls, Ont.

AMERICAN ASSOC. OF LOCAL FREIGHT AGENTS' ASS'NS.—G. W. Dennison, Penna. Co., Toledo, Ohio.

AMERICAN ASS'N OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carew Bldg., Cincinnati, Ohio; March 18; Chicago.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.—R. W. Pope, 33 West 39th St., N. Y.; 2d Friday in month; New York; March 30-April 1; Charlotte, N. C.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York; May 18; New York.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—S. F. Patterson, B. & M., Concord, N. H.

AMERICAN RAILWAY ENGINEERING AND MAINT. OF WAY ASSOC.—E. H. Fritch, Monadnock Bldg., Chicago, March 14-17, 1910; Chicago.

AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis; second Tuesday, May; Memphis, Tenn.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony Building, Chicago; June 20-22; Atlantic City.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. Edgar Marburg, Univ. of Pa., Philadelphia

AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., N. Y.; 1st and 3d Wed., except July and August; New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., N. Y.; 2d Tues. in month; New York.

AMERICAN STREET AND INTERURBAN RAILWAY ASSOCIATION.—B. V. Swenson, 29 W. 39th St., New York.

ASSOCIATION OF AM. RY. ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; June 29, 1910; Colorado Springs.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—E. H. Hemus, A., T. & S. F., Topeka, Kan.; May 25-27; Chattanooga, Tenn.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, Wisconsin Central Ry., Chicago; May 16-20, 1910; Los Angeles.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 24 Park Place, N. Y.

BUFFALO TRANSPORTATION CLUB.—J. N. Sells, Buffalo.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. in month, except June, July and Aug.; Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, Montreal, Que.; irregular, usually weekly; Montreal.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich., Fred. & Pot. R. R., Richmond, Va.; June 15, 1910; California.

INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., N. Y.; May 24-27; Niagara Falls, Ont.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago; May 23-26; Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & I. R. Ry., Two Harbors, Minn.; May; Cincinnati.

IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony Bldg., Chicago; June 15-17; Atlantic City.

NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tues. in month, ex. June, July, Aug. and Sept.; Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.

NORTH-WEST RAILWAY CLUB.—T. W. Flanagan, Soo Line, Minn.; 1st Tues. after 2d Mon., ex. June, July, August; St. Paul and Minn.

NORTHERN RAILWAY CLUB.—Fourth Saturday in month: Duluth, Minn.

OMAHA RAILWAY CLUB.—A. H. Christiansen, Barker Blk.; 2d Wednesday in month.

RAILROAD CLUB OF KANSAS CITY.—Third Friday in month; Kansas City.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, Pittsburgh, Pa.; 4th Friday in month, except June, July and August; Pittsburgh.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C., Collinwood, Ohio; May 16-18; St. Louis.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Norquist, Chicago.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—J. H. O'Donnell, Bogalusa, La.

SOUTHERN AND SOUTHWESTERN RY. CLUB.—A. J. Merrill, Prudential Bldg., Atlanta; 3d Thurs., Jan., April, Aug. and Nov.; Atlanta.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R. R. R., East Buffalo, N. Y.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, 199 Chestnut St., Winnipeg; 2d Monday, except June, July and August; Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony Bldg., Chicago; 3d Tuesday each month, except June, July and August; Chicago.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, Monadnock Bldg., Chicago; 1st Wednesday, except July and August; Chicago.

Traffic News.

The Vandalia Railroad has this week run a "seed and soil special" over its lines in Illinois, stopping at 21 cities and towns. Lectures were given by representatives of the Agricultural Department of the University of Illinois.

Records kept by the Merchants' Exchange of St. Louis show that the total tons of freight received at St. Louis in the years 1908 and 1909 are as follows: 1908, local, 16,691,158, through, 7,179,949; 1909, local, 18,179,856, through, 9,146,982.

The Adams Express Co. announces that on March 1 that company will absorb the New York & Boston Despatch Express Co., Earle & Prew's Express and the Hatch Express Co., of New Bedford. This will give the Adams a monopoly in southeastern New England. It is said that the Adams has owned the New York & Boston Despatch for 20 years.

The Traffic Bureau of the Merchants' Exchange of San Francisco will send William R. Wheeler, its manager, and Seth Mann, its attorney, to Washington, to appear before the Senate committee on oceanic canals on February 10 to advocate the inauguration of a government steamship service between Panama and San Francisco similar to that now operated between New York and Colon. This additional service, it is claimed, is necessary as a means for regulating freight rates.

The Southern Railway announces that its land and industrial department will at once resume active work in the promotion of immigration to the southern States. The extensive work of the company in this direction previous to 1908 was severely curtailed during the business depression, but now it is believed that the local situation warrants a renewal of the campaign. The company will make use of newspapers in the North and West and of fairs; and will pursue a somewhat similar policy in northern Europe. The company has a land and industrial office in London.

The Indiana Railroad Commission has announced that it will take up the question of equalizing rates, a matter that was begun nearly two years ago. The resumption of the question is due to the insistence of shippers. Shippers object to the plan of charging one rate in one direction from Indianapolis and a different rate for the same class of freight when shipped in another direction. The commission will endeavor to equalize conditions in the state and to secure the adoption of the Central Freight Association rates and agreement by the roads operating in Indiana.

It is given out at New Haven that the New York, New Haven & Hartford will raise its freight rates from New York and New England to the West, over the Canadian Pacific and over the New York, Ontario & Western, to the basis of 75 cents per 100 lbs. (first-class) New York to Chicago. These rates at present are on the basis of 69 cents (first-class) New York to Chicago. The increase will put these lines on the same basis as the standard lines and, it is said, will make the Erie and the Lackawanna willing to refrain from making their proposed reduction of their rates to the basis of 69 cents.

The receivers of the Washington, Baltimore & Annapolis Electric Railway announce that on March 1 they will increase the through fare between Baltimore and Washington to $1, and the round-trip rate from $1.25 to $1.50. On the same date cars will begin running through to the corner of Fifteenth and G streets, N. W., in Washington. At present the terminus is in the northeastern part of the city. There will be a limited car every half hour in both directions, in addition to the present local service, and transfers will be given on all of the intersecting lines of the Washington Railway & Electric Co., so that passengers will be carried without additional charge to all parts of the city.

The annual dinner of the Traffic Club of Chicago was held Wednesday evening of this week. The toastmaster was F. B. Montgomery and the speakers were Senator A. B. Cummins, of Iowa; E. A. Bancroft, counsel of the International Harvester Company, and Warren J. Lynch, passenger traffic manager

of the New York Central Lines. The attendance was about 300. Senator Cummins spoke on the propositions now before Congress to give more power to the Interstate Commerce Commission and called for progressive action. The power of the government to regulate railways is no longer in question. The problem is how to exercise power justly. If there are some railways that are earning more money than they ought, there are also some not earning as much as they ought. The public is beginning to understand that the railway is entitled to adequate revenue. Why, then, is there any conflict between the railways and the people generally? Fair discussion will evolve equitable laws.

J. H. Kane, traffic manager of the Spokane (Wash.) Merchants' Association, has written a letter to E. D. Sewall, vice-president of the Chicago, Milwaukee & Puget Sound, indicating that it is his opinion that this road should agree to fix certain rates to Spokane before it shall be given a franchise to enter that city. Mr. Sewall, replying in a letter dated January 25, indicated to Mr. Kane that the road is not disposed to make any such arrangement. He calls attention to the fact that the matter of rates to Spokane is now before the Interstate Commerce Commission and says that pending the decision it would be improper for the Chicago, Milwaukee & Puget Sound to take any action. He says he does not believe that the citizens of Spokane think that the granting of a reasonable franchise to his company should depend on its obligating itself in advance to any definite rate situation. It is the policy of the company to make such rate adjustments as will be fair and reasonable to all jobbing points along its lines and it certainly will have no other policy for the city of Spokane.

The New York Central has bought the first of a series of three demonstration farms. It is a "run-down" farm, situated within a few rods of the station at West Bergen, Monroe county. The road does not seek to equip anything even remotely resembling an agricultural school or a scientific experiment station. It is the purpose simply to show by inexpensive methods how the greatest yield at the greatest profit to the farm owner can be obtained. When the farm is developed to its highest degree of efficiency the road intends to sell it and start to build up some other "run-down farm" in western New York. The company's farm superintendent is T. E. Martin, of West Rush, N. Y., a practical farmer. He took his Genesee Valley farm several years ago, when it was yielding 60 bushels of potatoes to the acre, and by common-sense methods brought its yield up to an average of more than 300 bushels to the acre. Opportunity will be given to the graduates of the agricultural schools to serve as managers. Of the two other farms, one will be located in the Mohawk Valley and another on the western slope of the Adirondacks. The West Bergen farm is a "cold farm," so called, and will require the best efforts of the agriculturists. Their efforts will be concentrated to develop its four present crops—potatoes, cabbage, alfalfa and wheat. Experiments will be conducted with and without fertilizers and spraying, so as to show the greatest possible cash yield in proportion to actual expenditure.

When Commissioner Harlan of the Interstate Commerce Commission recently was in Chicago he was informed by William Ellis, interstate commerce counsel of the Chicago, Milwaukee & St. Paul, that this road probably had violated the letter of the Hepburn act by selling coal which it had transported during the recent period of severe weather. It is well known that other roads did like the St. Paul. Many of the western roads own coal mines, the product of which ordinarily is either consumed by the railway or sold by it at the mine. This method of handling the business does not violate the law as interpreted by the Supreme Court of the United States. During the recent severe weather, however, it became necessary for the roads to choose between selling coal which they had hauled for themselves or of seeing industries which they served shut down from lack of fuel. In a good many cases they chose the alternative of violating the law and thereby saved many industries from heavy loss. Mr. Ellis stated that the St. Paul had charged the consumer just what the coal had cost the company to produce it plus the full tariff freight rate, and he asked the commission to issue an order formally relieving the railway of liability, or at least placing its sanction on what it had done. Mr. Harlan told Mr. Ellis and the other railway men that it was his personal opinion that it would not be wise for the commission to take any action in reference to the matter, but that he would favor legislation to permit railways to sell their own coal during an emergency.

Hearing Regarding Relations of Railways to Coal Mines.

G. N. Brown, special examiner of the Interstate Commerce Commission, took testimony in Chicago last week in the investigation of the relations between the railways and coal mines which is being made by the Interstate Commerce Commission under the provisions of the Tillman-Gillespie resolutions. Previous testimony taken in this hearing has shown that various railway officers are stockholders in coal mines along their lines.

At the hearing in Chicago last week Thomas J. O'Gara, president of the O'Gara Coal Company, read a list of names of men who own stock and bonds of his company. The O'Gara company operates 14 mines in Saline county, Illinois, on the Cleveland, Cincinnati, Chicago & St. Louis, and produces 18,000 tons of coal a day. It has outstanding $5,000,000 common and $1,000,000 preferred stock and $2,750,000 in bonds. Mr. O'Gara said the books of the company show that at the time it was organized in 1906 5 per cent. gold bonds were issued to officials of the New York Central in the following amounts: W. C. Brown, president, $62,500; W. C. Brower, chief clerk to Mr. Brown, $10,000; J. Carstenseon, vice-president, $10,000; J. F. Deems, general superintendent of motive power, $25,000; C. F. Daly, vice-president, $25,000; E. T. Glennon, general attorney, $87,500; G. J. Grammer, late vice-president, $25,000; E. T. Henson, former chief clerk to Mr. Brown, $10,000; C. E. Schaff, vice-president, $25,000. The bonds were sold at 90 and interest has been paid on them regularly. Mr. O'Gara said that considerable stock was given as a bonus to the railway officers who bought bonds. The testimony showed that various other railway officers were stockholders in the O'Gara Coal Company.

Thomas C. Hughes, secretary of the Saline County Coal Company, whose mines are situated on the Big Four, testified that President Brown of the New York Central owned $91,000 of his company's bonds on October 15, 1909, and that C. E. Schaff, vice-president of the New York Central, owned $76,000. Mr. Hughes is secretary also of the Big Creek Coal Company, whose mines are situated on the Chicago, Burlington & Quincy, and he testified that F. C. Rice, general inspector of transportation of the Burlington, owns 100 of the shares of this coal company. F. R. Crawford, secretary of the Clover Leaf Coal Mining Company, said that G. H. Ross, vice-president of the Hawley Lines, owns 100 shares of the stock of this company, whose mines are located on the Toledo, St. Louis & Western at Coffeen, Ill.

Mr. O'Gara testified that Capt. G. J. Grammer, deceased, vice-president in charge of traffic of the New York Central, had reduced the rate on the coal of this company from Williamson county, Ill., to Chicago from $1.15 to $1 per ton, but that this involved no discrimination, as it was merely to place the mines on a parity with competing mines that enjoyed a rate to Chicago of $1.

STATE COMMISSIONS.

The Indiana Railway Commission has formally refused to modify its order requiring the railways of that state to equip their freight and passenger locomotives with headlights of at least 1,500 candle power. See an item in regard to this in General News.

The express companies doing business in Louisiana (American; Southern; Wells, Fargo & Co.; Pacific and United States) have been ordered by the Louisiana Railway Commission to supply their agents with pasters and tags printed in heavy type and bearing the words "Charges prepaid by

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF DECEMBER, 1909.

(See also issue of February 4.)

Name of road.	Mileage operated at end of period.	Operating revenues: Freight.	Passenger.	Total, inc. misc.	Operating expenses: Maintenance: Way and structures.	Of equipment.	Traffic.	Transportation.	General.	Total.	Net operating revenues (or deficit).	Outside operations. net.	Taxes.	Operating income (or loss).	Increase (or dec.) comp. with last year.
Atchison, Topeka & Santa Fe	7,458	$4,551,233	$1,701,756	$6,854,989	$1,245,312	$1,093,265	$157,679	$2,186,159	$167,509	$4,849,924	$2,005,065	.....	$283,753	$1,721,312	—1,214,182
Atlantic Coast Line	4,483*	1,985,950	672,706	2,892,844	337,800	348,150	44,273	794,178	75,077	1,599,478	1.293,366	.....	95,500	1,197,866	253,738
Boston & Maine	2,243	2,093,381	1,064,076	3,436,361	357,916	478,256	44,071	1,807,431	94,304	2,781,978	654,383	$4,744	182,128	476,999	—9,580
Central of Georgia	1,916	706,757	303,375	1,116,631	140,124	155.451	29,120	315,863	42,994	683,552	433,079	5,588	54,857	383,810	69.243
Central of New Jersey	668	1,549,281	332,894	1,982,805	153,318	300,311	23,040	560,539	40,378	1,077,586	905,219	—5,555	142,926	756,738	—60,924
Chesapeake & Ohio	1,939	1,968,531	413,930	2,505,449	220,503	468.263	48,101	716,695	53,154	1,506,716	998,733	4,393	67,500	935,626	126,196
Chicago & North Western	7,638	3,438,546	1,422,798	5,340,465	785,512	797,095	116,133	2,613,546	112,763	4,425,049	915,416	—11,239	228,000	676,177	—832,928
Chicago, Burlington & Quincy	9,021	4,243,424	1,735,303	6,561,481	859,494	1,370,049	145,182	2,412,991	182,156	4,969,872	1,591,609	—19,247	215,511	1,356,791	—769,412
Chicago, Milwaukee & Puget Sound	1,400†	721,340	59,893	800,977	25,042	56,436	24,618	292,280	11,378	409,754	391,223	1,040	20,000	372,263	.....
Chicago, Milwaukee & St. Paul	7,511	2,920,851	989,662	4,345,147	620,515	649,689	128,687	2,187,826	103,423	3,690,140	655,007	6,516	199,965	461,558	—1,170,957
Chicago, Rock Island & Pacific	8,034	2,994,604	1,457,265	4,751,132	767,940	714,055	137,219	2,055,856	150,156	3,825,226	925,906	—10,808	222,478	692,620	—560,461
Delaware & Hudson Co.	845	1,512,898	195,136	1,758,679	5,144	210,305	17,865	642,466	41,745	917,525	841,154	—1,901	21,468	817,785	20,413
El Paso & Southwestern Co.	867	491,985	90,544	611,620	103,796	80,795	8,172	170,814	23,533	387,110	224,510	—2,323	29,711	192,476	—46,234
Elgin, Joliet & Eastern	770	670,952	.....	732,264	76,756	160,392	4,334	263,641	36,816	541,939	190,325	.....	13,500	176,825	37,189
Erie	1,961‡	2,932,984	677,745	3,907,262	360,200	727,922	82,475	1.359,880	81.003	2,611,480	1,295,782	—84,403	108,930	1,102,449	178,475
Great Northern	7,100§	2,539,989	984,810	3,819,886	565,418	562,055	72,400	1,515,560	79,522	2,794,955	1,024,931	12,948	253,158	784,721	—563,079
Gulf, Colorado & Santa Fe	1,518	727,468	276,604	1,074,640	216,945	166,048	26,046	411,896	31,904	852,839	221,801	.....	43,393	178,408	—220,881
Illinois Central	4,550	3,313,063	1,009,544	4,905,335	388,471	1,194,830	120,822	1,764,021	102,479	3,570,623	1,334,712	—3,447	291,874	1,039,391	—521,573
Louisville & Nashville	4,598¶	3,229,056	948,426	4,483,844	441,304	721,180	99,657	1,378,467	91,875	2,732,483	1,751,361	7,429	125,445	1,633,345	303,550
Missouri, Kansas & Texas	3,072	1,461,068	694,887	2,298,254	325,664	260,022	62,469	928,740	77,677	1,654,572	643,682	—2,290	102,178	539,214	11,731
Mobile & Ohio	1,114	680,659	116,682	915,068	97,897	170,936	32,873	289,853	31,588	623,147	291,921	—2,256	21,956	267,709	17,029
Nashville, Chattanooga & St. Louis	1,230	633,128	226,856	918,367	135,190	131,279	37,405	333,239	23,289	660,402	257,965	1	20,500	237,466	10,684
Norfolk & Western	1,942	2,355,599	335,592	2,786,558	284,254	458,800	42,959	862,120	57,144	1,705,277	1,081,280	—1,266	84,000	996,014	181,558
Northern Central	466	875,537	173,400	1,115,831	96,404	215,318	13,827	500,722	24,294	850,566	265,265	241	24,708	240,798	103,963
Pennsylvania Co.	1,415	3,052,052	598,406	4,014,803	481,068	684,715	68,754	1,536,629	87,226	2,858,392	1,156,411	—3,211	173,273	979,927	198,269
Pennsylvania R. R. Co.	4,017	10,058,968	2,497,769	13,531,925	1,623,447	2,299,915	168,589	4,723,548	352,771	9,168,270	4,363,655	—89,411	197,526	4,076,718	981,728
Philadelphia & Reading	1,024	3,149,355	566,523	3,879,738	244,464	737,838	35,343	1,189,945	64,937	2,272,527	1,607,211	9,924	73,369	1,543,766	37,651
Philadelphia, Baltimore & Washington	716	684,595	590,780	1,445,328	183,278	223,055	23,364	590,642	36,730	1,057,069	388,259	.....	35,771	352,488	43,078
Pittsburgh, Cincinnati, Chic. & St. L.	1,468	2,366,332	608,858	3,333,061	389,549	548,239	69,045	1,207.260	68,927	2,283,020	1,050,041	—866	119,981	929,194	165,262
St. Louis & San Francisco	4,726	2,204,560	884,978	3,331,935	415,276	506,493	78,186	1,229,367	120,832	2,350,154	981,781	.....	121,012	860.769	—37,433
St. Louis Southwestern	773	465,840	136,309	630,260	94,343	83,159	28,034	137,571	22,715	365,822	264,438	—1,292	22.458	240,688	51
St. Louis Southwestern of Texas	697	203,507	81,891	306,361	80,904	60,929	10,774	143,366	17,748	313,721	—7,360	—300	10,090	—17,750	—39,190
Southern Ry.	7,050	3,272,676	1,343,066	5,028,486	516,930	810,760	110,420	1,674,713	157,265	3,270,088	1.758,398	7,177	185,942	1,579,633	227,922
Texas & Pacific	1,885	1,034,526	378,962	1,655,169	137,151	173,739	19,299	618,979	34,792	983,960	671,209	—1,582	67,394	602,233	—129,479
Vandalia	827	536,897	186,758	810,595	112,599	138,480	25,216	319,657	19,469	615,421	195,174	.....	24,089	171,085	26,772
Yazoo & Mississippi Valley	1,370	714,443	260,387	1,029,302	103,847	161,899	17.640	315,063	22,319	620,768	408,534	2.453	42,740	368.247	—75,258
SIX MONTHS OF FISCAL YEAR.															
Atchison, Topeka & Santa Fe	7,458	29,564,421	10,425,052	43,324,830	7,019,741	6,361,197	834,604	11,794,055	916,681	26,926,278	16,398,552	.....	1,585,242	14,813,310	760,180
Atlantic Coast Line	4,483*	9,822,784	3,154,756	13,973,645	1,956,848	2,088,649	234,839	4,247,132	373.417	8,900,885	5,072,760	.....	567,500	4,505.260	1,053,865
Boston & Maine	2,243	12,988,971	8,140,034	22,756,189	2,967,905	2,569,187	256,996	9,313,228	476,777	15,584,093	7,172,096	56,818	1,034,825	6,194,089	917,448
Central of Georgia	1,916	4,119,024	1,627,023	6,290,951	867,153	934,371	178,646	1,790,361	244,414	4,014,945	2,276,006	38,411	293,257	2,021.160	331,222
Central of New Jersey	668	8,833,718	2,401,089	11,865,562	1,060,401	1,890,654	179,441	3,134,753	247,157	6,512,406	5,353,156	196,081	590,947	4,958,390	635,995
Chesapeake & Ohio	1,939	12,378,780	2,653,273	15,654,715	1,706,049	2,935,792	267,275	4,032,670	287,113	9.228,899	6,425,816	—903	405,000	6,019,913	1,115,823
Chicago & North Western	7,638	26,055,745	10,141,305	39,165,191	6,309,449	4,680,735	712,807	14,368,816	598,525	26,670,332	12,494,859	—18,805	1,368,000	11,108,054	—1,157,547
Chicago, Burlington & Quincy	9,021	29,572,652	12,246,340	45,410,617	8,553,390	7,722,789	862,157	13,482,195	1,069,853	31,690,384	13,720,233	—83,973	1,293,547	12,342,713	—806,904
Chicago, Milwaukee & Puget Sound	1,400†	3,852,500	418,540	4,349,734	139,396	250,218	106,849	1,273,844	58,192	1,828,499	2,521,235	18,161	100,000	2,439,396	.....
Chicago, Milwaukee & St. Paul	7,511	23,496,525	7,870,385	33,912,588	4,867,287	4,062,681	687,448	12,668,888	576,330	22,862,634	11,049,954	170,678	1,233,128	9,987,504	—1,457,697
Chicago, Rock Island & Pacific	8,034	20,621,865	10,176,742	32,673,625	5,333,376	4,052,195	744,842	11,429,459	835,717	22,395,589	10,278,036	—83,093	1,223,625	8,971,318	846,205
Delaware & Hudson Co.	845	8,091,387	1,739,956	10,301,183	619,035	1,286,754	130,005	3,374,841	221,602	5,632,237	4,668,946	486	201,468	4,467,964	264,687
El Paso & Southwestern Co.	867	2,893,998	518,827	3,573,877	485,152	467,133	63,179	953,298	135,951	2,104,713	1,469,164	—5,564	124,546	1,339,054	—46
Elgin, Joliet & Eastern	770	4,332,255	137	4,680,512	422,277	871,487	24,789	1,308,819	100,364	2,727,736	1,952,776	.....	81,000	1,871,776	758,697
Erie	1,961‡	17,728,422	4,702,465	24,160,975	2,867,394	4,184,229	529,578	7,522,981	486,217	15,590,399	8,570,576	—59,337	631,067	7,880,172	1,300,909
Great Northern	7,100§	25,274,432	7,874.029	34,898,507	5,261,749	3,637,732	447,088	8,783,416	497.409	18,627.394	16,271,113	231,775	1,744,098	14,758,790	2,266,690
Gulf, Colorado & Santa Fe	1,518	4,517,313	1,607,002	6,515,389	1,209,465	937,066	140,670	2,318,559	177,065	4,782.825	1,732,564	.....	204,959	1,527,605	—539,225
Illinois Central	4,550	19,466,296	6,193,510	29,150,275	4,369,138	6,794,227	635,787	9,547,299	593,164	21,939,615	7,210,660	—21,297	1,318,083	5,871,280	—405,183
Louisville & Nashville	4,598¶	18,821,982	5,550,594	25,949,258	2,845,776	4,024,728	536,678	7,581,648	506,242	15,495,072	10,454,186	—44,116	751,730	9,658,340	1,989,736
Missouri, Kansas & Texas	3,072	9,366,059	3,994,895	14,156,839	1,924,053	1,683,144	321,229	4,835,658	435,981	9.200,065	4,956,774	—11,493	532,287	4,412,994	597,874
Mobile & Ohio	1,114	3,835,372	680,107	5,221.262	620,037	911,918	174,014	1,676,581	184,450	3.567,000	1,654,262	—15,074	133,173	1,506,014	—5,122
Nashville, Chattanooga & St. Louis	1,230	3,989,932	1,363,347	5,698,548	895,221	975,873	215,814	1,933,786	135,045	4,155,740	1,542,808	—5,396	123,000	1,414,412	131,565
Norfolk & Western	1,942	14,666,596	2,119,074	17,329,916	1,773,364	2,907,738	262,821	4,841,085	346,522	10,131,530	7,198,386	—9,648	504,000	6,684.738	1,293,565
Northern Central	466	5,106,682	1,135,380	6,594.410	699,377	1,216,925	82,346	2,750,403	126,891	4,875,942	1,718,468	5,390	148,250	1,575,608	211,462
Pennsylvania Co.	1,415	21.750,448	4,026,554	27,768,342	3,270,313	4,169,432	410,818	8,266,062	445,346	16,561,971	11,206,371	—16,796	896,663	10,292,912	2,523,438
Pennsylvania R. R. Co.	4,017	59,926,309	16,304,732	81,411,932	9,696,523	14,428,265	1,040,587	25,847,747	1,836,548	52,849,670	28,562,262	—510,706	1,185,157	26,866,399	5,372,027
Philadelphia & Reading	1,024	17,493,101	3,535,168	21,953,182	1,644,713	4,689,612	226,327	6,316,666	357,112	13,234,430	8,718,752	65,742	440,615	8,343,879	708,002
Philadelphia, Baltimore & Washington	716	4,607,965	3,612,736	9,098,001	1,236,504	1,520,248	138,101	3,437,510	188,021	6,520,384	2,577,617	.....	214,629	2,362,988	270,331
Pittsburgh, Cincinnati, Chic. & St. L.	1,468	13,756,511	4,001,459	19,860,488	2,628,746	3,266,234	394,421	6,229,409	356,387	12,875,197	6,985,291	—5,004	662,225	6,318,062	1,324,414
St. Louis & San Francisco	4,726	13,687,645	5,426,156	20,561,977	3,279,765	3,181,248	470,542	6,779,965	576,225	14,287,745	6,274,232	.....	686,722	5,587,510	684,294
St. Louis Southwestern	773	2,928,424	727,850	3,811,568	463,992	540,812	147,383	824,059	128,441	2,104,687	1,706,881	—5,244	131,156	1,570,481	262,078
St. Louis Southwestern of Texas	697	1,367,945	481,407	1,981,662	445,075	403,377	56,857	780,478	94,053	1,779,840	201,822	—1,196	51,756	148,870	30,870
Southern Ry.	7,050	19,238,535	7,836,220	29,284,292	3,466,479	4,833,377	677,320	9,323,918	856,184	19,157,278	10,127,014	12,652	975,667	9,163,999	1,100,468
Texas & Pacific	1,885	5,683,399	2,069,436	8,342,484	914,915	1,178,029	121,234	3,014,290	202,502	5,430,970	2,911,514	—27,650	303,927	2,579,937	140,505
Vandalia	827	3,277,029	1,176,618	4,955,551	732,774	835,541	146,960	1,724,218	111,879	3,551,372	1,404,179	.....	143,676	1,260,503	180,760
Yazoo & Mississippi Valley	1,370	3,655,517	1,176,346	5,154,126	1,136,016	964,370	98,762	1,630,859	144,257	3,974,264	1,179,862	18,003	216,440	981,425	176,988

* Mileage operated on December 31, 1908, 4,408. † Began operations on August 1, 1909. ‡ Mileage operated on December 31, 1908, 1,901. § Mileage operated on December 31, 1908, 6,898. ¶ Mileage operated on December 31, 1908, 4,388. — Indicates Deficits, Losses and Decreases.

shipper. Agent at destination must collect no charges." This tag is required to be placed on all packages on which charges have been prepaid.

Suits attacking the constitutionality of the Colorado law creating a railway commission have been withdrawn and the commission will be able to operate peacefully. But it is said that if it tries any drastic measures against the carriers the question will again be taken into court by a renewal of the proceedings now discontinued.

Pennsylvania: Refusal to Stop at Small Stations.

John A. Stanton et al. v. Pennsylvania Railroad.

This complaint is from merchants and milk shippers of New Stanton and Ruffsdale, stations on the Southwest branch of the Pittsburgh division of the Pennsylvania Railroad, protesting against the discontinuance of the stopping of trains 101 and 108. The road answered that the traffic to and from the stations referred to had been very light, and that the stops still being made at Tarr, one mile south of Ruffsdale and Youngwood, 2½ miles north of New Stanton, afforded reasonable facilities; also that the change was made for the purpose of furnishing faster service for the larger communities at the southern end of the line. It appears that the revenue from ticket sales and from milk shipments is inconsiderable, and that the quickened service has been much appreciated by the communities thus served. * * * The question seems to be whether or not the increasing patronage from the more distant communities should be permitted to outweigh the demand of the people of New Stanton and Ruffsdale. * * * One portion of a community must sometimes submit to inconvenience or loss of facilities in order that others may have reasonable accommodation. In Massachusetts the state commission in the Amherst case held it to be no ground of complaint that one express train each way per day had been withdrawn for the purpose of insuring close connections at important points. * * * The decision depends upon the balance of convenience between the petitioners and those desiring rapid traveling. * * * From the evidence before the commission, as well as their personal observation along the route traversed by trains Nos. 101 and 108, it clearly appears that, by far, the greater demand is for the faster service now afforded by those trains, and failure to meet the demand for this faster service would be a greater injustice to the public than is the refusal to stop those particular trains at New Stanton and Ruffsdale. The petition was dismissed.

COURT NEWS.

Judge Hook, of the federal court, has issued an interlocutory injunction forbidding the enforcement of the Oklahoma constitutional provision fixing a 2-cent fare and of 11 orders of the State Corporation Commission reducing freight rates, as they apply to the Missouri, Kansas & Texas, the Atchison, Topeka & Santa Fe and the Gulf, Colorado & Santa Fe. In the cases of the Midland Valley and the Kansas City Southern the examination of the records has not been completed. The Katy and the Atchison are required to give bonds of $250,000 each and the Gulf, Colorado & Santa Fe a bond of $50,000 to indemnify any who may be injured by the injunction.

In the federal court at St. Louis February 2 Judge Hook issued a restraining order enjoining the Illinois Central and the Southern Railway from putting into effect rates which it is alleged would be injurious to the Tennessee Central. The proceeding was instituted by the Tennessee Central, based on the action of the Illinois Central and the Southern, which in December summarily notified the Tennessee Central of changes in freight rates effective February 15, which would injure the business of the plaintiff by making it impossible for it to quote the through rates hitherto in effect from its shipping points to points on the Illinois Central and the Southern, which are the main outlets of the Tennessee Central and formerly jointly operated it. The Tennessee Central asks that the two roads be perpetually enjoined from putting the rates into effect. A hearing will be held this week.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

F. M. Johnson has been appointed auditor of the Ft. Dodge, Des Moines & Southern, with office at Boone, Iowa, succeeding W. Chamberlain.

See an item in regard to the officers of the various companies which have been consolidated and merged into the Arizona Eastern under Arizona Eastern in Financial News.

Howard G. Hetzler, president of the Metropolitan West Side Elevated of Chicago, has been elected president of the Chicago & Western Indiana. Britton I. Budd, succeeds Mr. Hetzler.

F. W. Corcoran, general freight and claim agent of the Williamsport & North Branch, has been appointed general auditor, with office at Hughesville, Pa., succeeding Charles E. Mosser.

Joseph M. Bryson, assistant general counsel of the Missouri, Kansas & Texas at St. Louis, Mo., has been appointed temporarily also general attorney for Missouri, with office at St. Louis, succeeding George P. B. Jackson, deceased.

W. A. Wildhack, auditor of the Lake Erie & Western at Indianapolis, Ind., has been appointed auditor of the Cleveland, Cincinnati, Chicago & St. Louis, with office at Cincinnati, Ohio, succeeding P. A. Hewitt, transferred.

J. F. Holden, vice-president and general manager of the Midland Valley at Muskogee, Okla., has been elected vice-president in charge of traffic of the Kansas City Southern, with office at Kansas City, Mo., succeeding E. F. Cost, resigned.

F. B. Montgomery, vice-president and general manager of the Illinois Northern at Chicago, has been elected president and general manager. S. D. Snow has been elected vice-president and W. M. Gale has been appointed treasurer, all with offices at Chicago.

C. G. Burnham, whose election as vice-president of the Chicago, Burlington & Quincy and the Colorado & Southern, with office at Chicago and jurisdiction over the traffic department, has been announced in these columns, was born on June 20, 1879, in England. After attending high school he began railway service in 1895 with the Great Northern as a clerk in the general freight department, remaining in that position until February, 1902, when he became chief clerk to the foreign traffic agent of the Chicago, Burlington & Quincy at Chicago. He was appointed general agent of the Great Northern Steamship Company February 1, 1904, and the following April he was made foreign traffic agent of the Chicago, Burlington & Quincy. In December, 1906, he was appointed assistant to Darius Miller, first vice-president of the Chicago, Burlington & Quincy, which position he held at the time of his recent appointment.

C. G. Burnham.

Carl M. Gage, vice-president and general manager of the Huntingdon & Broad Top Mountain, has been elected president and general manager, succeeding Samuel Bancroft, Jr., who becomes chairman of the board. Joseph Bancroft has been elected vice-president, all with offices at Philadelphia, Pa.

We announced in this column last week that W. M. Whitenton, manager of the Southern and Choctaw districts of the Chicago, Rock Island & Pacific at El Reno, Okla., had been elected vice-president and general manager of the Chicago, Rock Island & Gulf, with offices at Fort Worth, Tex., succeed-

ing J. W. Robins, resigned. We wish to correct this statement by saying that Mr. Whitenton has been elected vice-president only of the Texas line and that he will retain the office of manager of the Southern and Choctaw districts of the Chicago, Rock Island & Pacific. T. H. Beacom, general superintendent at Little Rock, Ark., has been appointed general superintendent also of the Choctaw and Southern districts.

W. H. Elmendorf, assistant auditor of the Lake Erie & Western at Indianapolis, Ind., has been appointed auditor, with office at Indianapolis, succeeding W. A. Wildhack, resigned to accept service elsewhere. John P. Hart succeeds Mr. Elmendorf. J. A. McDonald is appointed auditor of disbursements.

H. E. Byram, whose election as vice-president of the Chicago, Burlington & Quincy and the Colorado & Southern has been announced in these columns, was born November 28, 1865, at Galesburg, Ill. He began railway work in 1881 with the Chicago, Burlington & Quincy at Galesburg as a call boy; he was later a stenographer in the general superintendent's office and chief clerk to the superintendent of terminals at Chicago. For five years from 1889 he was out of railway service. He then went with the Great Northern, first as clerk in the general manager's office and later as chief clerk in the vice-president's office. In 1898 he was made assistant general superintendent of the Montana Central at Great Falls, Mont., and the following year was made superintendent of the Cascade division of the Great Northern. He was then made assistant to the first and fourth vice-presidents of the Chicago, Rock Island & Pacific at Chicago, and in 1904 became general superintendent of the Southwestern district of the Rock Island at Topeka, Kan. Later in the same year he was appointed general superintendent of the Nebraska district of the Burlington, and in May, 1909, was appointed assistant to the second vice-president, with office at Chicago, from which position he has just been promoted.

H. E. Byram.

Operating Officers.

W. C. Bradley has been appointed superintendent of the Pan-American, with office at Tonala, Mex.

C. H. Beatty, general superintendent of the Salt Lake & Ogden, at Salt Lake City, Utah, has resigned.

W. A. Sours has been appointed superintendent of the St. Paul & Des Moines, with office at Des Moines, Iowa.

E. H. Holden has been appointed superintendent of the Texarkana & Fort Smith, with office at Texarkana, Tex., succeeding I. H. Luke.

W. M. McDonald, superintendent of the Southern division of the Florida East Coast at Fort Pierce, Fla., has been transferred to Miami, Fla.

W. C. Ranous has been appointed superintendent of transportation of the Minneapolis, St. Paul & Sault Ste. Marie, with office at Minneapolis, Minn.

G. G. Grundy, superintendent of the Temiscouata Railway, has been appointed general manager, succeeding D. B. Lindsay, with office at Rivier du Loup, Que.

B. W. Steele, assistant general manager of the Atlanta & St. Andrews Bay at Dothan, Ala., has been appointed general manager, succeeding W. R. Beaupree.

D. J. Nelson has been appointed a trainmaster of the Chicago, Burlington & Quincy, with office at Sheridan, Wyo., succeeding C. D. Peckenpaugh, promoted.

See an item in regard to the officers of the various companies which have been consolidated and merged into the Arizona Eastern under Arizona Eastern in Financial News.

W. B. Drew, car accountant of the Maine Central at Portland, Me., has been appointed superintendent of car service with office at Portland, and his former position has been abolished.

G. W. Kirtley, superintendent of car service of the Erie at New York, has been appointed superintendent of transportation, with office at New York, and his former position has been abolished.

E. W. Hoffman, general yardmaster of the Cincinnati, Hamilton & Dayton at Indianapolis, Ind., has been appointed a trainmaster, with office at Indianapolis, succeeding H. F. Reynolds, who succeeds Mr. Hoffman.

C. P. A. Lonergan, assistant superintendent of the Oregon Short Line at Pocatello, Idaho, has been appointed an assistant superintendent on the Oregon division of the Oregon Railroad & Navigation Company, with office at Portland, Ore.

S. E. Burkhead, recently appointed assistant superintendent of the Colorado lines of the Denver & Rio Grande at Pueblo, Colo., has been appointed superintendent of the Utah lines, with office at Salt Lake City, Utah, succeeding A. B. Apperson, resigned.

D. K. Townsend, superintendent of the Williamsport & North Branch, has been appointed assistant general manager, and H. A. Knipe, superintendent of the Eagles Mere branch, has been appointed general superintendent and purchasing agent, both with offices at Hughesville, Pa.

W. H. De Witt, superintendent of the Missouri & North Arkansas, with office at Leslie, Ark., having resigned, that office is abolished. H. R. Irvine, general roadmaster at Searcy, Ark., has been appointed an assistant superintendent, with office at Searcy, and W. D. Danley has been appointed an assistant superintendent, with office at Leslie. The position of general roadmaster is also abolished.

E. B. John, whose appointment as superintendent of the Delaware division of the Philadelphia, Baltimore & Washington has been announced in these columns, entered the service of the Pennsylvania Railroad on June 24, 1895, in the office of the division engineer of the Philadelphia division, since which time he has been in the operating department. In 1897 he went to the office of the division engineer of the Tyrone division, and two years later was transferred to the office of the principal assistant engineer at Altoona, Pa. In 1900 he was made assistant supervisor of the Pittsburgh division, and a year later was transferred to the New York division. The following year he was made supervisor of the Delaware division, and in 1904 was transferred to the Maryland division, remaining there until 1905, when he was again transferred to the Middle division. In 1908 he was made division engineer of the Delaware division, and on March 24, 1909, was appointed principal assistant engineer of the Philadelphia, Baltimore & Washington, which position he held at the time of his recent appointment.

Traffic Officers.

J. G. Perrin has been appointed a traveling passenger agent of the International & Great Northern at the City of Mexico, Mexico.

H. N. Page has been appointed general agent of the Chicago, Milwaukee & Gary, with office at Rockford, Ill., succeeding J. H. Miller.

L. R. Jones has been appointed a traveling freight agent of the Missouri, Kansas & Texas at the City of Mexico, Mexico, succeeding A. P. Japp.

John C. Emig has been appointed industrial agent of the Cleveland, Cincinnati, Chicago & St. Louis and the Cincinnati Northern, with office at Cincinnati, Ohio.

Wyn Morris, city passenger agent of the Pittsburgh & Lake Erie at Pittsburgh, Pa., has been appointed an assistant general passenger agent, with office at Pittsburgh.

See an item in regard to the officers of the various companies which have been consolidated and merged into the Arizona Eastern under Arizona Eastern in Financial News.

Engineering and Rolling Stock Officers.

E. C. Anderson has been appointed mechanical engineer of the Colorado & Southern, with office at Denver, Colo.

C. H. Montague has been appointed superintendent of motive power of the St. Paul & Des Moines, with office at Des Moines, Iowa.

See an item in regard to the officers of the various companies which have been consolidated and merged into the Arizona Eastern under Arizona Eastern in Financial News.

T. J. Wyche, division engineer of the Western Pacific at Elko, Nev., has been appointed chief engineer, with office at San Francisco, Cal., succeeding Virgil G. Bogue, retired.

W. Alexander, assistant district master mechanic of the Chicago, Milwaukee & St. Paul at Milwaukee, Wis., has been appointed district master mechanic, with office at Milwaukee, succeeding J. C. Miller, resigned.

James T. Wallis, superintendent of motive power on the Erie division of the Pennsylvania Railroad and of the Northern Central, has been appointed acting superintendent of the West Jersey & Seashore also of the Philadelphia & Camden Ferry, with office at Camden, N. J., succeeding D. H. Lovell, granted leave of absence.

N. N. Boyden, master mechanic of the Southern Railway at Atlanta, Ga., has been transferred to Knoxville, Tenn., succeeding J. F. Sheahan, resigned to accept service elsewhere. George Akans, master mechanic at Birmingham, Ala., succeeds Mr. Boyden; E. M. Sweetman, master mechanic at Sheffield, Ala., succeeds Mr. Akans, and Frank Johnson, general foreman of locomotive repairs at Knoxville, succeeds Mr. Sweetman.

J. W. Stone has been appointed acting division engineer of the Philadelphia division of the Pennsylvania Railroad, with office at Harrisburg, Pa., succeeding G. H. Brown, granted leave of absence; N. B. Pitcairn, assistant supervisor of Division 6, on the Middle division, has been appointed supervisor of Division 1, on the Conemaugh division, with office at Verona, Pa., succeeding H. C. Bolenius, transferred; E. C. Silvius succeeds Mr. Pitcairn, with office at Mifflin, Pa. T. K. Minsker has been appointed assistant supervisor of Division 13, on the Pittsburgh division, with office at Pittsburgh, Pa., succeeding R. A. Klein, promoted.

Purchasing Officers.

W. J. Souder, auditor and superintendent of the St. Paul & Des Moines at Des Moines, Iowa, is now auditor and purchasing agent, with office at Des Moines.

See an item in regard to the officers of the various companies which have been consolidated and merged into the Arizona Eastern under Arizona Eastern in Financial News.

B. J. Yungbluth, storekeeper of the Lake Erie & Western at Lima, Ohio, has been appointed general storekeeper of the Pittsburgh Railways Co., with office at Pittsburgh, Pa. W. J. Given succeeds Mr. Yungbluth, with office at Lima.

OBITUARY.

A. B. Adams, general roadmaster of the Wabash, with office at Peru, Ind., died at Peru on February 22.

J. V. Parker, formerly assistant general freight agent of the Kansas City, Ft. Scott & Memphis, assistant general freight agent of the Union Pacific and traffic manager of the Toledo & Ohio Central, but for the last ten years in private business, died in Chicago on January 22.

John F. Barnard, formerly a well-known railway executive, died at Los Angeles, Cal., on February 6. Mr. Barnard was 81 years old and was in railway service in various capacities from 1850 to 1905. He was general manager of the Hannibal & St. Joseph, now a part of the Burlington, from 1884 to 1887, and from 1886 to 1892 was with the Ohio & Mississippi, now a part of the Baltimore & Ohio Southwestern, first as president and later as general manager also. He was then made receiver of the Omaha & St. Louis, now a part of the Wabash, and later was receiver and then president of the St. Clair, Madison & St. Louis, now the Missouri & Illinois Bridge & Belt Company, which is the last position he held.

Railway Construction.

New Incorporations, Surveys, Etc.

Atchison, Topeka & Santa Fe.—An officer writes that contracts have been let for 30 miles of second track changes incident to reducing grade on the east end of the Albuquerque division, and on 37 miles of second track from Flagstaff, Ariz., to Williams, on the same division, as well as on 22 miles of second track from Cottonwood, Cal., east via Barstow to Daggett. (Jan. 14, p. 118.)

Brownwood North & South.—This company has been incorporated in Texas, with $30,000 capital, to build from Brownwood, in Brown county, to May, 20 miles. The incorporators include J. A. Walker, J. J. Timmins, H. Ford, J. C. Weakley, B. Smith and others, of Brownwood, Tex. (Jan. 14, p. 113.)

Canadian Northern Ontario.—This road has been extended from Sellwood Junction, Ont., northward to Gowganda Junction, 30.7 miles.

Canadian Pacific.—The Battle river section on the Central division has been opened for business from Wilkie, Sask., westward 131.3 miles to Hardisty, Alb. On the Western division, the Lacombe branch of the Edmonton section, has been extended from Stettler, Alb., eastward to Castor, 35 miles. A new branch called the Forward branch has been opened for business from Weyburn, Sask., on the Portal section, Westwood to Forward, 25.9 miles. The Carmangay branch has also been opened for business from Kipp, Alb., on the Crow's Nest section, northward to Carmangay, 28 miles.

This company will probably double-track its main line during 1910 from Winnipeg, Man., west to Portage la Prairie, 56 miles. It is understood that next year the double tracking will be continued west to Brandon.

Canadian Roads.—It is said that the Canadian government will start work this spring on the proposed line from The Pass, Kew., north to Hudson Bay. It has not yet been definitely decided whether the northern terminus will be at Fort Churchill or Fort Nelson. (Dec. 24, p. 1261.)

Chicago & Elmhurst.—Incorporated in Illinois, with a capital of $5,000 and office at Chicago. The plans call for a line from Oak Park, Ill., westerly to the township of Addison, in Du Page county, about 15 miles. The incorporators and directors include H. I. Williford, Jr., F. D. Kailmer, F. W. Pringle, H. L. Fearing and W. A. Ranson.

Coal & Coke.—A new branch has been opened for business from Gassaway, W. Va., east to Sutton. (Nov. 26, p. 1036.)

Crystal City & Uvalde.—This road is open for traffic from Uvalde Junction, Tex., to Crystal City, 41 miles. (Nov. 26, p. 1036.)

Dakota, Kansas & Gulf.—Surveys are said to be under way from Beloit, Kan., southwest to Kearney, about 200 miles. W. H. Mitchell, president, Beloit.

Denver & Gulf.—According to press reports from Denver, Colo., a new outlet from that place to the Gulf of Mexico will be provided over the Denver & Gulf. This company was incorporated in Colorado with $1,000,000 capital to build from Texhoma, Okla., northwest into Colorado, connecting with the Union Pacific at a point near Limon. The plans call for a line from Texhoma, south to Dallas, Tex., from which point traffic arrangements are to be made over an existing line to the Gulf. Grading is said to be under way on about 100 miles. The promoters are Chicago capitalists. Franklin A. Umsted, president, formerly at Chicago, and now at Texhoma.

Duluth, Rainy Lake & Winnipeg.—Capital is said to have been secured by the Duluth, Winnipeg & Pacific. Contracts are to be let this spring to build from Virginian, Minn., south to Duluth, 74.4 miles. H. T. Hazen, chief engineer, room 619, Lyceum building, Duluth. (Dec. 3, p. 1107.)

Duluth, Winnipeg & Pacific.—See Duluth, Rainy Lake & Winnipeg.

LACKAWANNA & WYOMING VALLEY.—An officer writes that work is now under way by B. T. McGowan, building a temporary line about 3,000 ft. long near North Pittston, Pa. (Feb. 4, p. 280.)

LOUISVILLE & NASHVILLE.—On the Henderson division a new line has been opened for business from Atkinson, Ky., to Ellmitch, 53.2 miles.

MANISTEE & NORTH EASTERN.—Train service has been extended on the Manistee River branch from Walton, Mich., northeast to Sigma. (Nov. 19, p. 991.)

MEXICAN SOUTHERN.—A new branch has been opened for business from Oaxaca, Mex., southward to San Pablo, 18 miles. (Aug. 13, p. 297.)

MICHIGAN CENTRAL.—According to press reports, this company has decided to build an additional track from Buffalo, N. Y., west to Detroit, Mich., making that division over 200 miles a three-track system. It is said the improvements are to be made to accommodate the expected increase in traffic, following the opening of the Detroit tunnel.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—An officer writes that contracts are to be let the later part of February or early in March for improvements as follows: Cut-off from New Richmond, Wis., west to Whitrow, Minn., 17 miles, maximum grades are to be 5/10 per cent. with light curves; cut-off from Spencer, Wis., west to Owen, 19 miles, maximum grade to be 5/10 per cent. with light curves. The work includes putting up a steel bridge over the St. Croix river. (Feb. 4, p. 280.)

The First district of the Duluth-Superior line is in operation from Onamia, Minn., northeast to Superior, Wis., 98.3 miles. (July 23, p. 168.)

MISSOURI, OKLAHOMA & GULF.—This road has been extended from Wapanucka, Okla., southward to Durant, 29 miles. (Dec. 24, p. 1261.)

NEW YORK SUBWAYS.—Plans for the Broadway-Lafayette subway in the borough of Brooklyn are completed, and as soon as the necessary legal formalities are complied with bids are to be asked for the work. The route is from the Williamsburg bridge along Broadway to Lafayette avenue, then through Lafayette avenue to a junction with the Fourth avenue subway at Atlantic avenue.

NORFOLK & WESTERN.—An officer writes that the principal improvements to be carried out are as follows: 49.7 miles of second track in Ohio on improved line and grade, which will complete the continuous double-track between Kenova, W. Va., and Columbus, Ohio; 11.5 miles of second track between Wyoming, W. Va., and Devon, and 5.4 miles of second track between Vivian, W. Va., and Huger, including four tunnels. (Feb. 4, p. 280.)

Contracts were let February 4 for some of the second-track work in Ohio and West Virginia, also on 3.2 miles of the Indian Creek branch as follows: D. W. Flickwir, Roanoke, Va., 3.2 miles of branch line on Indian creek above Cedar Bluff, including tunnel; J. R. Serpell & Son, Louisville, Ky., three miles of double-track, including tunnels, east of Huger, W. Va.; Luck Construction Co., Roanoke, Va., three miles of double-track west of Wyoming, W. Va.; Carpenter & Boxley, Roanoke, Va., 3.5 miles double-track, west of Wharncliffe, W. Va.; Moorman Bros. Co., Lynchburg, Va., 3.5 miles double-track, east of Devon, W. Va.; The Ryan Co., Lexington, N. C., 11 miles double-track in Ohio, west of Davis; E. G. Nave Bros. Co., Portsmouth, Ohio, seven miles double-track, east of Piketon, Ohio; Sturm & Adams, Columbus, Ohio, six miles between Renick and Delano, Ohio. The rest of the second track work will be carried out by the company's forces.

NORTHERN PACIFIC.—This company is said to be planning to build a number of lines in the Olympic peninsular, in the state of Washington. The Port Angeles & Olympia was surveyed about two years ago, and follows a water grade from Olympia north to Port Angeles. The Olympic Peninsular has been surveyed from Port Angeles west through the valley of the Soleduck river to a point near the Pacific coast, thence south to the Northern Pacific at Moclips, Wash. It is said right of way is now being secured for this line. The officers of both these companies and the Port Angeles Peninsular are said to be identified with the Northern Pacific.

OKLAHOMA ROADS.—According to press reports from Chattanooga, Okla., J. H. Ransom is promoting a line from the southern terminus of the Chicago, Rock Island & Pacific branch line at Chattanooga, southwest to Davidson, about 30 miles. This is thought to be a project of the Rock Island. It is understood that a number of short branch lines are also to be built.

OLYMPIC PENINSULAR.—See Northern Pacific.

PITTSBURGH, BUTLER, SLIPPERY ROCK & GROVE CITY (ELECTRIC).—Organized in Pennsylvania to build an electric line from Butler, Pa., to Slippery Rock, 20 miles. The directors include W. C. Thompson, J. A. Smith, Dr. W. C. McCandless, A. M. Reiber, of Butler, and J. C. Kerr, Slippery Rock. F. E. Barrett, Pittsburgh, is in charge of surveys.

PORT ANGELES & OLYMPIA.—See Northern Pacific.

PORT ANGELES PENINSULAR.—See Northern Pacific.

QUANAH & GULF.—A contract is said to be let for building the first section of 12 miles to Medicine Mound, Tex. The projected route is from Quanah, Tex., south via Medicine Mound to Crowell, thence southeast via Seymour and Graham to Waco. Plans are under consideration to build the section south of Graham via Stephenville, Glen Rose and Cleburne to Waco. Address L. E. Walker, Quanah. (Sept. 17, p. 521.)

SAN ANTONIO, GULF & TAMPICO.—Incorporation has been asked for by this company in Texas, with a capital of $90,000. The plans call for a line from San Antonio, Tex., southwesterly to a point in LaSalle county, about 90 miles. J. F. Edwards, of San Antonio and St. Louis, Mo., is the principal promoter. The incorporators include A. B. Hedden, Plainfield, N. J.; G. S. Simons, New York; H. M. Aubrey and A. L. Mattlock, of San Antonio.

SAN DIEGO, EL CAJON & ESCONDIDO (ELECTRIC).—Surveys are said to be made and capital secured for an electric line from San Diego, Cal., north to Escondido, about 40 miles. Contracts for the work, it is understood, will be let about April 1. F. M. Fairchild, chief engineer, Oakland, Cal.

SANTA FE, LIBERAL & ENGLEWOOD.—See Santa Fe, Raton & Eastern under Railway Financial News.

SANTA FE, RATON & DES MOINES.—See Santa Fe, Raton & Eastern under Railway Financial News.

SANTA FE, RATON & EASTERN.—See this company under Railway Financial News.

SCRANTON, DUNMORE & MOOSIC LAKE.—See American Railways under Railway Financial News.

SOUTHERN PACIFIC.—The San Joaquin division has been extended from Mabel, Cal., northward to Haiwee, 13 miles.

UNION PACIFIC.—According to press reports this company will carry out improvements to secure a shorter route from Denver, Colo., east to Fort Morgan. This is to be accomplished by building a new line, which will reduce the distance over the present route by about 25 miles. (Sept. 17, p. 521.)

UTAH ROADS (ELECTRIC).—Application has been made for a charter by Jesse Knight to build from Salt Lake City, Utah, south about 50 miles to Provo. Application has also been made by another company represented by A. J. Evans, S. L. Chipman and others for permission to start work at once, over the same route, on a line to cost about $3,000,000.

VIRGINIAN.—A new line has been opened for business on the Winding Gulf branch, from Loop Junction, W. Va., to Pemberton, six miles. (Aug. 6, p. 259.)

WESTCHESTER & NORTHERN.—Incorporated in New York with $1,000,000 capital to operate a steam or electric railway from a connection with the New York, Westchester & Boston, at White Plains, N. Y., to Danbury, Conn., 45 miles, of which 35 miles are to be in the state of New York, and 10 miles in Connecticut. There is also to be a branch from Pound Ridge, Westchester county, to the line of the New Haven, in Putnam county, 14 miles. Robert T. Bird of Hartford, Conn., is a director.

Railway Financial News.

American Railways (Electric).—This company has taken a perpetual lease of the Scranton, Dunmore & Moosic Lake, a steam road running from Scranton, Pa., northeast 10 miles. The American Railways Co. proposes to electrify the road and operate it in connection with the Scranton railways.

Arizona & Colorado.—See Arizona Eastern.

Arizona Eastern.—The property, equipment and franchises of the Maricopa & Phoenix, the Gila Valley, Globe & Northern, the Arizona & Colorado, the Arizona Eastern and the Arizona Eastern of New Mexico have been consolidated under the name of the Arizona Eastern Railroad, and all business for these roads will hereafter be transacted by the Arizona Eastern Railroad. All officers and employees of the companies which have been absorbed will continue in like capacity with the Arizona Eastern Railroad.

Arizona Eastern of New Mexico.—See Arizona Eastern.

Boston & Maine.—See Boston Railroad Holding Co.

Boston Railroad Holding Co.—It is understood that the company has bought sufficient additional Boston & Maine stock to give it a majority of the $31,991,490 outstanding common and preferred stock.

Buffalo, Rochester & Pittsburgh.—The New York Up-State Public Service Commission has given the Buffalo, Rochester & Pittsburgh permission to sell $1,277,000 additional consolidated mortgage 4½ per cent. bonds. This will make $6,012,000 of these bonds outstanding. Of the new bonds $500,000 have been sold and the remainder will be sold from time to time, the proceeds to be used for improvements.

Chicago, Burlington & Quincy.—Howard Elliott, president of the Northern Pacific, has been elected a director, succeeding Daniel Willard, resigned.

Chicago City Railway.—The directors have declared a regular quarterly dividend of 1½ per cent. on the $18,000,000 stock and an extra (annual) dividend of 4 per cent., payable March 2. This extra dividend of 4 per cent. compares with an extra dividend of 3 per cent. paid a year ago.

Detroit, Toledo & Ironton.—H. B. Hollins & Co., New York, have sold their holdings of about $1,700,000 5 per cent. notes of the D., T. & I. to the D., T. & I. noteholders' protective committee. The notes are secured by the deposit of a controlling share of the stock of the Ann Arbor, and in addition by the deposit of $5,000,000 consolidated bonds of the Detroit, Toledo & Ironton. It is understood that this purchase will give the noteholders' committee sufficient influence to increase its representation on the board of directors of the Ann Arbor, and it appears to open the way for a reorganization of the Detroit, Toledo & Ironton.

Galveston, Harrisburg & San Antonio.—In the suit brought by Thomas H. Hubbard and the Crocker estate to foreclose $6,354,000 Western division second mortgage income bonds, the court has held that the lease of the G., H. & S. A. by the Southern Pacific is *ultra vires* of the G. H. & S. A. charter, and that therefore the Southern Pacific cannot be held responsible for the interest on the income bonds. The Southern Pacific does not depend on the lease for control, since it owns $27,056,600 of the $27,084,372 outstanding stock of the G., H. & S. A.

Gila Valley, Globe & Northern.—See Arizona Eastern.

Hudson & Manhattan.—The Hudson Companies have sold through Harvey Fisk & Sons to a syndicate including J. P. Morgan & Co. $5,500,000 5 per cent. three-year notes, secured by the deposit of Hudson & Manhattan bonds, at the rate of $1,500,000 bonds for every $1,000 notes. There are outstanding $3,554,500 6 per cent. notes of the Hudson Companies which mature in 1910.

Louisiana & Arkansas.—The interest coupons due March 1 will be paid at the Standard Trust Co. offices, New York. The former fiscal agents of the company were Fisk & Robinson. (Feb. 4, p. 2821.)

Maricopa & Phoenix.—See Arizona Eastern.

New Orleans Great Northern.—The interest coupons due February 1 were paid at the Knickerbocker Trust Co. offices, New York. Heretofore these interest payments were made at the offices of Fisk & Robinson. (Feb. 4, p. 2821.)

Pittsburgh, Westmoreland & Somerset.—There was sold at auction at New York $353,700 par value of stock, which constitutes a majority of the total stock, for $1,200. The road runs from Ligonier, Pa., to Somerset, 25 miles.

Santa Fe, Liberal & Englewood.—See Santa Fe, Raton & Eastern.

Santa Fe, Raton & Des Moines.—See Santa Fe, Raton & Eastern.

Santa Fe, Raton & Eastern.—The reorganization plan of the Yankee Fuel Co., which has been affiliated with the Santa Fe, Raton & Eastern, the Santa Fe, Raton & Des Moines and the Santa Fe, Liberal & Englewood, contains the following information and recommendations in regard to the railway companies:

The Yankee Fuel Co. and the Santa Fe, Raton & Eastern can be put in operation by an expenditure of from $200,000 to $500,000, and although the price of coal in this district is low, the properties could be operated at profit. The Santa Fe, Raton & Des Moines and the Santa Fe, Liberal & Englewood should be abandoned, with the possible exception of that portion of the S. F., R. & D. M. between Carisbrook and Cunningham.

The Santa Fe, Raton & Eastern is a short road now built from Raton east to the Yankee mine, about nine miles, and has almost no other traffic than that furnished by carrying coal from the mine to a connection with the Atchison, Topeka & Santa Fe at Raton. It is said that there has been actually spent on the property $203,800.

The Santa Fe, Raton & Des Moines is a road partly under construction, running from Carisbrook southeasterly to the Colorado & Southern at Des Moines, 39 miles. It is reported that $569,715 has been actually spent on the property and eight miles of track has been laid, while the roadbed has been graded for the entire distance. The road is paralleled for 30 miles by the St. Louis, Rocky Mountain & Pacific, so that by building nine miles from Carisbrook to a connection with the St. Louis, Rocky Mountain & Pacific all need for the remainder of the line would be obviated.

The Santa Fe, Liberal & Englewood has a line projected eastward from Des Moines through Liberal to Englewood, Kan., thence southeasterly to Woodward, Okla., 310 miles. There has been actually expended, it is said, $171,175. Fifteen miles of roadbed has been graded and one mile of track laid near Woodward.

Savannah, Augusta & Northern.—It is said that this property is to be sold on March 15 to satisfy a claim of about $300,000 by William J. Oliver, the contractor.

Scranton, Dunmore & Moosic Lake.—See American Railways.

Southern Pacific.—Stockholders are to vote April 6 on the question of making a mortgage for $50,000,000 to cover the franchises and property now owned or hereafter acquired in the city and county of San Francisco, Cal. Officers of the company say that there is no intention of immediately issuing the bonds.

It is said that the company has sold its Wells, Fargo & Co. (express) stock, which amounted on June 30, 1909, to $1,530,000, but which since has increased to $4,590,000 through the 200 per cent. stock dividend. At present prices of the Wells, Fargo & Co. stock this sale would have brought the Southern Pacific about $8,000,000, but it is reported that the railway company received considerably more than this.

See also Galveston, Harrisburg & San Antonio.

The Congress of Ecuador has authorized the municipality of Guayaquil to construct a railway to connect the City of Guayaquil with some of the coast towns. A certain proportion of the internal revenue taxes of that municipality is to be used to pay the expenses of the survey and the cost of construction. The terminus of the railway has not yet been selected.

Supply Trade Section.

The Ewald Iron Co. has moved its main office and warehouses from St. Louis, Mo., to Louisville, Ky.

The Pilliod Company, with works at Swanton, Ohio, has opened an office at 30 Church street, New York, where R. H. Weatherly, president, will make his headquarters.

The Midvale Steel Co., Philadelphia, Pa., has let the contract to the Riter-Conley Mfg. Co., Pittsburgh, Pa., for a one-story, 66-ft. x 135-ft., steel frame addition to its plant on Wissahickon avenue. The estimated cost of the work is $20,000.

D. A. Bonitz, formerly railway representative of Philip Carey & Co., Cincinnati, Ohio, has entered the supply trade under the firm name of D. A. Bonitz & Co. The company, which has established an office in the Fisher Building, Chicago, will deal in railway and mill supplies.

The Western Electric Company, New York, has adopted a new trade name for those types of telephones which have heretofore been known as Intercommunicating or Private Line Telephones. These are henceforth to be known as "Western Electric Inter-phones," and the word inter-phone is to be used to the exclusion of the old designations.

The Titan Steel Casting Company, Newark, N. J., has purchased the business of Benjamin Atha & Company and will continue to operate the plant as in the past, giving special attention to the production of cast steel bolsters, manganese steel railway motor gears and pinions and other car and locomotive castings. The following are the officers of the new company: Benjamin Atha, president; Louis A. Shepard, vice-president and general manager; Henry G. Atha, treasurer, and C. W. Owston, Jr., secretary.

Henry J. Bellman, secretary of the American Hair Felt Co., New York, and manager of hair felt sales for the H. W. Johns-Manville Co., New York, died suddenly on Sunday night, February 6, at his home in New York. Mr. Bellman was born in Pennsylvania about forty-one years ago. He first entered the hair felt trade in Sharpsburg, Pa. From 1900 to 1909 he was manager of the railway department of the American Hair Felt Co. He was a Mason, a member of several clubs and widely known among the railway men and car builders.

Frank A. Foster, mechanical engineer, 25 Kenyon street, Providence, R. I., a graduate of the Worcester Polytechnic Institute and at the present time in the employ of the American Locomotive Co., expects to leave, about March 1, for China to accept a position in which he will have considerable to do with machinery and the mechanical departments of railways. He is desirous of obtaining catalogues and general information concerning American machinery and manufactures. Mr. Foster expects to sail from Seattle, Wash., March 22. His address in China will be Davenport Road, Tientsin, care Albert C. Lee.

Lee Higginson & Co., Boston, Mass., the Royal Securities Corporation, Ltd., Montreal, and the Dominion Securities Corporation, Ltd., Toronto, are offering $2,350,000 first mortgage 6 per cent. bonds of 1909-1939 of the Canadian Car & Foundry, at 102½, yielding 5.80 per cent. The total amount of bonds outstanding, including those now offered, is $3,500,000, and there is reserved for future capital expenditures at 75 per cent. of cost thereof, $4,000,000, making a total authorized issue of $7,500,000. The bonds are secured by a first mortgage on the properties, estimated to have a replacement value of over $7,500,000. President Curry estimates that of the total capacity of car building companies in Canada the Canadian Car & Foundry Company's plant comprises more than 85 per cent.

The Merchants' Steel & Supply Co., Chicago, has been organized with a capital stock of $100,000. The company will buy and sell scrap iron and steel, new and relaying rails, cars and locomotives and railway supplies and equipment. Headquarters have been established in the Marquette Building, and a yard capable of handling large quantities of material with all modern equipment will be established in Chicago. The officers of the company are: W. K. Kenly, president and treasurer; W. T. Twomey, vice-president and general manager; L. W. Parker, secretary. The directors are: W. H. McDoel, ex-president of the Monon railway, chairman of the board; F. Fisher, vice-president Massillon Bridge Co., Massillon, Ohio; E. M. Allen, vice-president American Refractories Co., Chicago, and Messrs. Kenly and Twomey.

A number of manufacturers of railway supplies whose shops are situated in the district in Chicago represented in Congress by James R. Mann, chairman of the House committee on interstate commerce, are circulating a petition asking Mr. Mann to use his influence to stop the agitation in Congress for drastic legislation affecting railways. Mr. Mann himself has introduced some of the most radical measures pending in the house. The petition says: * * * Without questioning the merits or demerits of the railway legislation proposed by you, or others, we believe that no harm can be done by limiting much of the proposed railway legislation and giving the railways opportunity to work out or demonstrate their intention of carrying out railway legislation already in effect. We have suffered greatly in our business during the last two years, largely on account of the poor financial condition of railways. The chief promoters of the petition are the following: "American Steel Foundries, American Brake-Shoe & Foundry Company, Blue Island Rolling Mill & Car Company, By-Products Coke Corporation, Dearborn Drug & Chemical Works, Federal Furnace Company, Featherstone Foundry & Machine Company, Griffin Wheel Company, Iroquois Iron Company, Pickards, Brown & Co., Rogers, Brown & Co., Railway Steel Spring Company, Sherwin, Williams & Co., Willard, Sons & Bell Company."

At the annual meeting of the board of directors of the Standard Coupler Company, New York, Edmund H. Walker was elected a vice-president. Mr. Walker entered the service of the company in February, 1905, as assistant to President George A. Post. Subsequently he was made general sales manager and now becomes vice-president. He is widely and favorably known in railway and supply circles, and this announcement of his promotion will be read with interest and pleasure by all who know him. Prior to his connection with the Standard Coupler Company, Mr. Walker had 16 years' experience in railway service on the Great Northern; Atchison, Topeka & Santa Fe; Chicago, Burlington & Quincy; Minneapolis, St. Paul & Sault Ste. Marie, and Bismark, Washburn & Great Falls Railways in the operating, traffic, accounting and construction departments.

E. H. Walker.

TRADE PUBLICATIONS.

Steel Truck Side Frame.—The McConway & Torley Co., Pittsburg, Pa., has just issued a pamphlet descriptive of the Buhoup steel truck side frame.

Great Northern.—A pamphlet has been prepared to advertise the homesteads to be opened to settlers March 1, 1910, in the Rocky Boy Indian lands in northeastern Montana.

Pocket Voltmeter.—The Electric Storage Battery Co., Philadelphia, Pa., has just issued bulletin No. 119, which describes its low reading pocket voltmeter, designed especially for battery testing.

Vanadium Metals in Railway Service.—The Vanadium Metals Co., Pittsburg, Pa., has just issued a small booklet containing general information and tabulated data regarding the use of Vanadium metals in railway service.

Goheen Mfg. Co.—The Goheen Mfg. Co., Canton, Ohio, has published a booklet containing 14 views of steel structures protected by its carbonizing coating. The views include railway bridges, elevated structures, roundhouses and mining and smelting plants.

Leach Sanders.—The American Locomotive Sander Co., Philadelphia, Pa., has just issued a catalogue showing the various styles of Leach sanders, of which this company has been sole owner for more than 10 years. These catalogues will be sent to anyone interested upon receipt of a request.

Exhaust Fans.—The American Blower Co., Detroit, Mich., in bulletin No. 271 describes the "A B C " cast-iron exhaust fans, type V, and in bulletin No. 272 the Dixie exhaust fan. These bulletins contain both half-tone and line illustrations of these fans, along with general information and data regarding their speed, capacity and horse-power.

Motors, Generators, Telephones, Etc.—The Western Electric Co., New York, in bulletin No. 5131 describes its type "IL" motors and generators; in bulletin 5230, its polyphase induction motors; in bulletin 1001, its magneto non-multiple switchboards with self-restored line signals; in bulletin 1002, its magneto non-multiple switchboards with manually restored line signals; in bulletin 1105, its selection, installation and wiring of intercommunicating telephone systems. All of the foregoing bulletins are the Western Electric Co.'s standard 8-in. x 11-in. size, printed on heavy glazed paper and containing a large number of half tone and line illustrations, with very complete descriptions of the equipment. The following smaller sized booklets and post card folders have also been issued: Bulletin 1153 on the manufacture of lead-covered cable and booklet 1106 on automatic intercommunicating telephones for business and residence service. Another small booklet contains a detailed description of Hawthorn arc lamps, both carbon and flaming, and another describes No. 1317 type magneto telephone sets.

RAILWAY STRUCTURES.

Barstow, Cal.—The Atchison, Topeka & Santa Fe has prepared plans for a concrete passenger station of the Mission type, which it is estimated will cost $250,000. Mention was made of this work in last week's issue under the heading, Barstow, N. Mex.

Bath, N. Y.—An officer of the Delaware, Lackawanna & Western is quoted as saying that the company will put up a new brick passenger station in Bath, to cost between $20,000 and $35,000.

Beach Grove, Ind.—The Cleveland, Cincinnati, Chicago & St. Louis is to spend $1,000,000 for car shops, in addition to the new locomotive shops, at Beach Grove, near Indianapolis.

Bradford, Pa.—The Buffalo, Rochester & Pittsburgh has let the contract to Allis-Chalmers, Milwaukee, Wis., for a tie treating plant.

Evansville, Ind.—The Evansville & Terre Haute expects to build coal docks on the Ohio river between Wabash and Twelfth avenues. Plans are not yet completed.

Ft. William, Ont.—A consular report says that the excavation work, piling and concrete footings have been finished for the union station being built jointly by the Canadian Pacific and the Grand Trunk Pacific. The building will have a frontage of 272 ft. and is to be partly three stories high. It is to cost about $100,000. (Oct. 29, p. 832.)

Galveston, Tex.—The Chicago, Rock Island & Pacific expects to begin work during the coming year on new docks. At least two piers will be built on the tide lands which the company now owns.

Goldfield, Nev.—According to press reports, the Tonopah & Goldfield is securing land as a site for shop buildings and a new roundhouse to be built in Goldfield.

Hoisington, Kan.—See Kansas City, Kan.

Jefferson, Ohio.—It is said that the Lake Shore & Michigan Southern will build a 170-ft. bridge.

Kansas City, Kan.—The Missouri Pacific has filed a statement of the proposed expenditures for the coming year, which includes: $266,000 for a bridge over the Kaw river, $36,000 for a new passenger station and $435,000 for yards and shops at Hoisington, Kan.

Kansas City, Mo.—The Chicago Great Western has completed arrangements to enter the proposed union depot. By the terms of the agreement the company will bear one-twelfth of the cost and own one-twelfth of the property. The Chicago Great Western is the last of the roads entering the city to join the project, so that it is now assured that all trains entering the city will use the new station.

Kearney, Neb.—The Union Pacific is to build a new four-track steel coaling station.

La Junta, Colo.—Press reports say the Atchison, Topeka & Santa Fe is planning to build a new freight house, coal chutes and possibly car repair shops.

Laredo, Tex.—According to press reports the National Railways of Mexico will let contracts soon, and start work within 60 days, on the new steel and reinforced concrete bridge over the Rio Grande river. (Oct. 8, p. 665.)

Liberal, Kan.—The Chicago, Rock Island & Pacific is to build a machine shop 40 ft. x 60 ft. and some additional yard tracks.

Los Angeles, Cal.—Application has been made by the Los Angeles Interurban railway to the United States Engineers for permission to build two trestle bridges over the Cerritos Slough north of Long Beach Harbor. The petition has met some opposition and the final action is still in doubt.

Montreal, Que.—Work is now under way on the St. Louis boulevard subway, to be 900 ft. long, and to have a roadway of 50 ft., with 10-ft. sidewalks, under the Canadian Pacific tracks, the roadway to carry double tracks for street railways. The roadway of the Canadian Pacific is 80 ft. wide and crosses the boulevard at an angle of about 35 deg. A steel superstructure will cover the entire width of the roadway. The estimated cost of the improvements is $200,000. (Nov. 26, p. 1041.)

According to press reports, the Canadian Northern is planning to open a passenger station in the up-town section of Montreal.

New Richmond, Wis.—See Minneapolis, St. Paul & Sault Ste. Marie.

Norfolk, Va.—An agreement has been entered into between the Norfolk & Western and the Norfolk & Southern for the construction of a union passenger station and an eight-story office building, to be used jointly by these companies and the Virginian Railway. The structure is to be put up on property already owned by the Virginian. (July 16, p. 129.)

Pueblo, Colo.—The Atchison, Topeka & Santa Fe plans to abolish the Union avenue crossing and increase its facilities for handling freight.

Rutland, Vt.—Plans, it is said, are being made by the Rutland Railroad to put up a new boiler shop. The cost of the improvement, with the necessary equipment, will be about $60,000.

Sapulpa, Okla.—The St. Louis & San Francisco has completed plans for a 500-ft. car repair shed. Work is now under way on new freight transfer sheds.

Scottsburg, Ind.—The Indianapolis & Louisville has let the contract for a new freight and passenger station at the junction with the proposed Cincinnati, Madison & Western traction line. The building will be two stories high and will contain the offices of both companies.

Wallace, Idaho.—The Northern Pacific is to build a new roundhouse to replace the one destroyed by fire last fall.

Walla Walla, Wash.—The Northern Pacific, according to local press reports, is planning for a new passenger station of pressed brick.

Watertown, S. Dak.—The Minneapolis & St. Louis is to build a new passenger station, estimated to cost $165,000.

Weldon, N. C.—According to press reports the Atlantic Coast Line will build a new freight house in Weldon. The structure is to be of brick construction with granite trimmings.

Late News.

The items in this column were received after the classified departments were closed.

The Grand Rapids Electric has ordered 12 city street cars from the American Car & Foundry Co.

The Chicago, Rock Island & Pacific freight car inquiry includes 825 steel underframe, forty-ton box cars.

The Idaho & Washington Northern is said to have ordered 100 flat and 100 box cars. This item is not confirmed.

The Chicago Great Western has ordered 10 combination cars from the Pullman Company and 200 refrigerator cars from the American Car & Foundry Co.

The Grand Trunk five Pacific locomotives, specifications for which were given in the *Railway Age Gazette* of December 17, were ordered from the Baldwin Locomotive Works.

The National Railways of Mexico and their American enginemen and conductors have reached a satisfactory settlement in the differences which recently threatened a strike.

Surveys are said to be made by the Lake Shore & Michigan Southern for a new route to secure minimum grades from Ashtabula Harbor, Ohio, south to Carson, about five miles.

The Denver, Laramie & Northwestern, reported in the *Railway Age Gazette* of February 4 as being in the market for freight equipment, is said to have ordered a number of box cars from the American Car & Foundry Co.

A. D. Parker, vice-president of the Colorado & Southern at Denver, Colo., has been elected also president and director of the Colorado Midland and president of the Colorado Springs & Cripple Creek District, with office at Denver.

Surveys are shortly to be started for a line from Beeville, Tex., or Kennedy west via Oakville and Cotulla. It is expected to have construction work under way by September. Lee Frisby, of Austin, represents a syndicate which will build the line.

It is said that the reorganization plan of the Wheeling & Lake Erie and the Wabash-Pittsburgh Terminal, recently under consideration by the bankers interested in these properties, has been abandoned because of legal difficulties. (Jan. 14, page 118.)

The Great Lakes Connecting is to be built in the western part of Pennsylvania as an independent freight and passenger line. The projected route is from Ellwood City, Pa., northeast to Raymilton, 42 miles. The line will form a connecting link between several trunk lines.

The directors of the Peoria & Eastern have declared an annual dividend of 4 per cent., payable April 1, on the outstanding $4,000,000 4 per cent. non-cumulative income bonds. The full 4 per cent. was paid on these bonds from 1902-1908, inclusive, but no interest was paid in 1909.

Plans have been filed for a new car depot to be built by the Interborough Rapid Transit (New York) at the northeast corner of Spuyten Duyvil road and Two Hundred and Forty-second street. The building will be two stories high, 530 ft. long, 89 ft. wide, and is to cost $100,000.

It is understood that all the large railways entering Portland, Ore., Seattle, Wash., and Tacoma, will in the near future be extended to Vancouver, B. C., and that the Canadian Pacific and probably three of the larger Canadian roads will extend south from Vancouver, B. C., into Seattle and Tacoma and possibly to Portland.

By a vote of 3,007 to 91, switchmen, members of the Brotherhood of Railroad Trainmen, voted late on February 9 to strike. The switchmen are employed on 18 railways entering Chicago, and it is estimated that the strike will affect about 4,000 men. The vote to strike followed the refusal of the railways to grant an increase of five cents per hour in wages of switchmen.

The U. S. Court at Trenton, N. J., has issued an order for a foreclosure sale of the Camden & Trenton Railway property. The date for the sale will be fixed in the next few days by the master. This action is favorable to the reorganization plan agreed to by the first and general mortgage bondholders' committee.

Application has been made in Rhode Island for a charter by the Southern New England Railway Co., which is to be a new branch of the Grand Trunk. The plans call for a line from Palmer, Mass., to which point the Grand Trunk now has a connection through Rhode Island, connecting Woonsocket, Valley Falls and Pawtucket with Providence, reaching tidewater at the Providence river. It is understood that the cost of the work in Rhode Island will be $5,000,000.

The Louisville & Nashville is said to have given a contract to the Callahan Construction Co., of Knoxville, Tenn., to build an extension of 25 miles under the name of the Wasioto & Black Mountain. The projected route is from Pineville, Ky., through Bell and Harlan counties, to Harlan. It is said the contract is worth over $500,000, and includes piercing a 600-ft. tunnel. It is expected to have the work finished in about seven months. (See Wasioto & Black Mountain, Dec. 17, p. 1214.)

Charles H. Phillips, district freight and passenger agent of the El Paso & Southwestern and the Morenci Southern at Los Angeles, Cal., has been appointed a general agent, with office at Los Angeles. F. B. Winship has been appointed a general agent, with office at San Francisco, Cal., succeeding G. F. Herr, general agent Pacific coast, resigned to accept service elsewhere. O. S. Huntington, contracting agent at San Francisco, has been appointed traveling freight and passenger agent, with office at San Francisco.

The Central Idaho has been incorporated in Idaho and expects to have 220 miles finished by the end of 1911. The proposed route is from Owinza, Lincoln county, Idaho, on the main line of the Oregon Short Line northwesterly through Lincoln, Elmore and Ada counties to Boise, and to a connection with the Payette Valley, at New Plymouth, in Canyon county. The line is to be built by the Oregon Short Line to eliminate the heavy grades on the Glens ferry section of the present line, and to put Boise on the main line.

The Chicago, Burlington & Quincy, it is said, will at once start 20 construction crews at work on the Creston division. The work to be carried out includes the completion of the double-tracking from Red Oak, Iowa, west to Balfour. This is the only section between Chicago and Pacific junction at present without double tracks. Work is under way on another section of the road putting up a bridge near Conway. A large number of bridges are also to be built to replace the present wooden bridges with steel and cement structures.

The Boise & Western has applied for permission to build through government lands in Oregon, along the Malheur river, to the eastern part of Harney county, and it is expected that surveys through the Malheur canyon into Harney valley will be filed shortly. The line follows the route of the Oregon Eastern, a Harriman line, for a considerable distance, and crosses it at several points. The officers are: Col. C. E. Wood, president; J. McI. Wood, secretary; William Hanley, of Burns; C. W. Mallett, J. W. McCulloch, Ontario, Ore., and D. C. O'Reilly, Portland, are directors.

The annual report of the Department of Railways and Canals of Canada for the fiscal year April 1, 1908, to March 31, 1909, which has just been issued, says that out of the total of 915 miles, which constitute the prairie section of the Grand Trunk Pacific, 861 miles are graded and bridged and the track has been laid on 697 miles, of which 92 miles have been fully ballasted, 90 miles have had two lifts of ballast put under it, and 414 miles have received one lift of ballast, leaving 101 miles of skeleton track. The total expenditure on this section up to March 31, 1909, for material and work was $25,814,378, and the net interest on bonds was $1,099,557. The estimated cost of the prairie section, including interest on bonds, is placed at $33,007,449. The expenditure on the mountain section up to March 31, 1909, amounted to $3,768,826. The total estimated cost of the mountain section is $67,056,000.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Central Railroad of New Jersey has ordered 10 ten-wheel locomotives from the Baldwin Locomotive Co.

The Ft. Worth Belt Railway has ordered one six-wheel switching locomotive from the American Locomotive Co.

The Denver, North Western & Pacific is said to have ordered 20 locomotives from the American Locomotive Co. This item is not confirmed.

The Mississippi River & Bonne Terre has ordered two consolidation freight locomotives from the American Locomotive Co. Delivery is specified for May, 1910.

The New York, Ontario & Western, reported in the *Railway Age Gazette* of February 4 as being in the market for six locomotives, has ordered this equipment from the American Locomotive Co.

The Groveton, Lufkin & Northern has ordered, from the American Locomotive Co., one 4-6-0 locomotive for May delivery. The engine will have cylinders 18 in. x 26 in. and a total weight of 130,000 lbs.

The Chicago, Rock Island & Pacific, reported in the *Railway Age Gazette* of January 28 as being in the market for 25 Pacific and 50 consolidation locomotives, has ordered this equipment from the American Locomotive Co.

The Norfolk & Western, reported in the *Railway Age Gazette* of January 28 as figuring on locomotives for 1910 delivery, has ordered 40 freight locomotives from the Baldwin Locomotive Works, and 10 passenger locomotives from the American Locomotive Co.

The Chesapeake & Ohio, as reported in the *Railway Age Gazette* of February 4, has ordered two Shay locomotives from the Lima Locomotive & Machine Co. and one Mallet from the American Locomotive Co. The Mallet will be made to a design of the builders and the Shay locomotives will have the following dimensions and special equipment:

General Dimensions.

Weight on drivers	300,000 lbs.
Total weight	300,000 lbs.
Cylinders	Three; 17-in. x 18-in.
Diameter of drivers	46 in.
Type of boiler	Extended wagon top
Working steam pressure	200 lbs.
Tubes, number	310
" outside diameter	2 in.
" length	13 ft. 6 in.
Firebox, type	Sloping crown
" length	114 in.
" width	61¼ in.
Grate area	48.48 sq. ft.
Water capacity	8,000 gals.
Coal capacity	18,000 lbs.

Special Equipment

Bell ringer	Western
Boiler lagging	Franklin, magnesia
Brakes	Westinghouse No. 6 E. T.
Headlight	16 in., C. & O. standard
Injector	Hancock, No. 10
Piston and valve rod packings	Jerome
Safety valve	Phillips
Sanding devices	Watters
Sight-feed lubricators	Nathan
Steam gages	Ashcroft
Tires	Latrobe
Tubes	Charcoal iron
Valve gear	Stevenson
Wheel centers	Cast steel

CAR BUILDING.

The Western Maryland is in the market for 500 to 1,500 freight cars.

The Boston & Maine is said to be in the market for 100 passenger cars. This item is not confirmed.

The Detroit United Railway, reported in the *Railway Age Gazette* of January 28 as being in the market for 100 cars, is now reported to be figuring on 75 pay-as-you-enter and 17 interurban cars. This item is not confirmed.

The Central of New Jersey has ordered the 10 open platform coaches, one vestibule combination car and four vestibule coaches, reported in the *Railway Age Gazette* of December 3, from the Harlan & Hollingsworth Corporation.

The Chicago, Rock Island & Pacific is in the market for 70 passenger cars of various types. Coaches, combination, baggage, postal and dining cars are included in the inquiry. The company is also in the market for 1,600 freight cars, including box, refrigerator, automobile and cabooses.

The Norfolk & Western, reported in the *Railway Age Gazette* of January 7, in an unconfirmed item, as being in the market for 3,000 freight cars, advises that it has ordered 500 gondolas and 1,500 hopper cars from the Western Steel Co., and 500 stock and 500 coke cars from the American Car & Foundry Co.

The Boston & Maine, as reported in the *Railway Age Gazette* of February 4, has ordered 2,000 steel underframe, 30-ton box cars from the Laconia Car Co. These cars will weigh 37,000 lbs. and will be 36 ft. long, 8 ft. 6 in. wide and 8 ft. 2 in. high, inside measurements, and 40 ft. 2¼ in. long, 9 ft. 5 in. wide and 14 ft. high, over all. The special equipment includes the following:

Bolsters, body	Pressed steel
Bolsters, truck	Cast steel
Brakes	Westinghouse
Brake-beams	6-in. I-section
Brake-shoes	Steel back, Am. Brake-Shoe & Fdy. Co.
Brasses	M. C. B. standard, 4¼-in. x 8-in.
Couplers	Gould on 1,500 cars; Simplex on 500 cars
Doors	Side
Door fixtures	Camel Co.'s Security No. 5
Draft gear	Miner
Dust guards	Wood
Journal boxes	Gould on 1,000; Symington on 1,000
Paint	B. & M. standard
Roofs	Chicago-Cleveland, Winslow Improved
Side bearings	B. & M. standard
Springs	O. H. steel, Railway Steel-Spring Co.
Trucks	Arch bar
Wheels	33-in. chilled

The Intercolonial, as reported in the *Railway Age Gazette* of December 24, has ordered five first-class day coaches from the Preston Car & Coach Co. These cars will have a seating capacity for 78 passengers and will weigh about 105,000 lbs. They will be 71 ft. 1½ in. long, 8 ft. 9 in. wide and 7 ft. 7¾ in. high, inside measurements, and 79 ft. 10¼ in. long, 10 ft. 2 in. wide and 10 ft. 2 in. high, over all. The bodies and underframes will be of wood. The special equipment includes:

Bolsters, body	Cast steel double
Brakes	Westinghouse
Brake-beams	Simplex
Brake-shoes	Steel back
Brasses	M. C. B., I. R. C. standard
Couplers	Janney; McConway & Torley
Curtain fixtures	National Lock Washer Co.
Curtain material	Pantasote
Draft gear	Miner tandem
Heating system	Safety Car Htg. and Ltg. Co.
Journal boxes	McCord
Lighting system	Safety Car Htg. and Ltg. Co.
Platforms	Standard Coupler Co.
Roofs	Canvas
Side bearings	Chicago Ry. Equipment Co.
Springs	Montreal Steel Works
Vestibules	Pullman (wide)
Vestibule diaphragms	Ajax
Vestibule trap-doors	Dayton
Window fixtures	National Lock Washer Co.

MACHINERY AND TOOLS.

The Great Northern has issued a list of 149 tools.

The Bethlehem Steel Co. is in the market for a large list of machine tools, including some heavy machines.

The Upson Nut Co., Cleveland, Ohio, has ordered from the Wellman-Seaver-Morgan Co., Cleveland, Ohio, 11 Hughes gas producers for its proposed steel plant.

The West Penn Railways Co. has ordered from the Westinghouse Electric & Manufacturing Co. two 12,000-h.p. steam turbines, two 200-h.p. turbines and 18 sets of 300-h.p. railway motors.

The Pressed Steel Car Co. has ordered from Jos. T. Ryerson & Sons, Chicago, a number of heavy multiple punches for steel underframe work. The machines are to be motor-driven and will weigh 200,000 lbs.

The Merchants' Despatch Transportation Co., East Rochester, N. Y., has ordered from Jos. T. Ryerson & Sons, Chicago, hydraulic and pneumatic machines, punches, shears, saws, pumps, etc., to equip its new car plant.

The Republic Iron & Steel Co. has ordered from the Wm. Tod Co., Youngstown, Ohio, a twin tandem compound engine, cylinders, 44 in. and 76 in. x 60 in. The engine is designed for the company's new blooming mill at Lansingville, Ohio.

IRON AND STEEL.

The Pennsylvania has ordered 200 tons of bridge steel from the American Bridge Co.

The Kansas City Southern has ordered, from the Lackawanna Bridge Co., 600 tons of bridge steel.

The Idaho & Washington Northern has ordered from the Pennsylvania Steel Co. 950 tons of bridge steel for the Pend d'Oreille bridge.

The Harriman Lines have ordered 16,000 tons of rails from the Tennessee Coal, Iron & Railroad Co. and 32,000 tons from the Illinois Steel Co.

The New York, New Haven & Hartford is in the market for 2,000 tons of structural steel for stations and track elevation work at Worcester, Mass.

The Philadelphia & Reading has ordered 200 tons of structural steel from the Jones & Laughlin Steel Co. for stations at Tioga, Pa., and Nicetown.

The Spokane & Inland Empire has ordered 200 tons of bridge steel from the American Bridge Co. and 5,000 tons of rails from the Carnegie Steel Co.

The Baltimore & Ohio has ordered 25,100 tons of rails from the Maryland Steel Co., 24,850 tons from the Carnegie Steel Co., 21,700 tons from the Illinois Steel Co., and 7,150 tons from the Bethlehem Steel Co.

General Conditions in Steel.—There seems every reason to think that the steel business will show favorable returns for the first quarter of the present year. The earnings of the corporation will probably show an increase. Although January was generally a poor month and February has but 28 days, there seems reason to believe that the March returns will reach $15,000,000. In 1907 the March earnings were $14,137,000 and in 1906 $13,819,000. Structural steel and rails have been bought in some good quantities during the past two weeks.

SIGNALING.

The Union Pacific is installing automatic block signals on its line between Topeka, Kan., and Salina, a distance of 118 miles. About 50 per cent. of the material required for this construction has been received, and about 8 per cent. of the work has been done.

The Chicago & North Western has awarded to the General Railway Signal Co. the contract for the interlocking signals to be installed at the new terminal passenger station of that road in Chicago. The interlocking will be "all-electric." There will be five cabins with an aggregate of 530 working levers.

The Chicago & North Western expects to install in the near future an 80-lever electric interlocking plant at Mayfair, Chicago. There will be electric locking in addition to detector bars on all main line tracks, and electric locking without detector bars on sidings. The plant will protect a crossing of the C., M. & St. P. and C. & N. W., and, in addition, a junction of the North Western's St. Paul line with the cut-off between Evanston and the Fortieth street yards.

The North Western will install with its own forces a mechanical interlocking plant at the junction of two and three main tracks at Willmette on the Evanston track elevation.

The North Western has just put in service a mechanical interlocking plant at Bluffs, Ill. This is a 28-lever Saxby & Farmer machine with 24 working levers. The plant protects the east junction of the Fulton cut-off. The work was done by the General Railway Signal Company.

The North Western has just put in service home and distant disk automatic normal-clear block-signals on the Lee county cut-off, 12 miles, double-track, between Nelson, Ill., and Nachusa, Ill. All signals are on bridges over the tracks, and the home and distant signals are on separate bridges. The work was done by the Hall Signal Company.

Woods' Center and Side Bearings.

Anti-friction center and side bearings, made by Edwin S. Woods & Co., Chicago, are shown herewith.

As the movement of the center plates is small, a 2½-in. diameter roller is required to turn through but about one-eighth of its circumference to accommodate the movement of the plates for a 70-ft. car on a 35-deg. curve. Sufficient rolling movement can therefore be obtained by using a flat-sided roller of from ¾-in. to 1 in. wide.

The center plate shown, Fig. 1 and 2, is said to be the result of a series of investigations of rollers under load, both above and below their elastic limits. The aim has been to

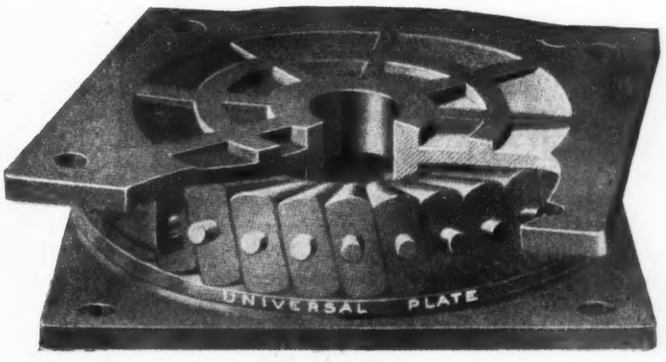


Fig. 1—Center Bearing with Universal Plate in Normal Position.

devise a plate wherein the stresses will always be below the limit of elasticity, which condition seems necessary in order to obtain longest possible life of the bearing.

The plate shown is 12 in. in diameter and carries 40 rollers, each 2½ in. high and 3½ in. long. If this same plate were filled with rollers of circular cross section, 2½ in. in diameter, it would hold but 14 rollers. Thus it seems very evident that by the use of flat-sided rollers the carrying capacity of the plate is greatly increased. It is also claimed that the end thrust of each roller, due to coning, is greatly reduced.

A plate about ½ in. thick is interposed between the rollers and the base plate. The top portion of this interposed plate slants to coincide with the cone of the rollers, while the bottom part is vertical to coincide with the top of the base pate. This universal plate, therefore, within reasonable limits of tilting of the truck bolster prevents any one or two of the rollers being subjected to the entire load. It is said that un-

Fig. 2—Center Bearing with Universal Plate in Tilted Position.

der a load of 60,000 lbs. the bearing shown in the illustration develops a load per roller of 1,500 lbs. and an end thrust per roller of 625 lbs., while the load per inch diameter—inch length of roller is 240 lbs. The resistance to turning in this type of plate is substantially the same as any other thrust-bearing of the same general design which has full circular coned rollers, as the greater the cone of the rollers the more resistance the plate will develop in turning. It is said that a force applied 40 in. from the center of one of these plates requires about 230 lbs. to move a 40,000-lb. load. This is said to be about 85

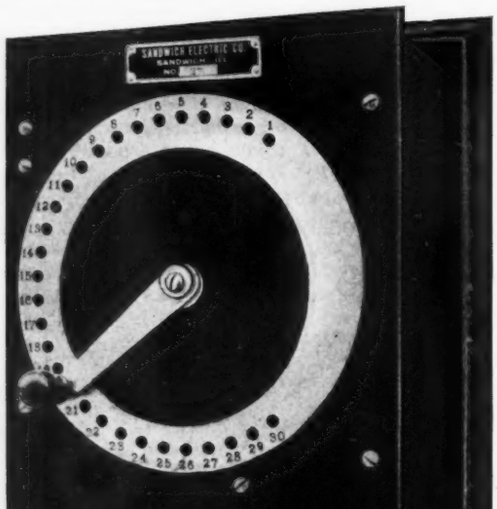
per cent. less than would be required to move an ordinary friction type center plate of equal diameter.

In Fig. 3 is shown one of the newer types of Woods' side bearings, adapted to six-wheel passenger truck construction. The body bearing consists of three parts, a roller, a casing and a steel bar, the bar covering the open top of the casing through which the roller is introduced. The load is transmitted directly through the body of the roller, which centers in the casing by gravity when released from contact with the roller-bearing surface. This bearing is made in both single and double roller type.

Fig. 3—Woods' Side Bearing for Passenger Trucks.

The Sandwich Selector.

The Sandwich selector, used extensively on the Cleveland, Cincinnati, Chicago & St. Louis for calling way stations on telephone lines, is a "step-by-step" apparatus. This principle has been in use several years in automatic telephone systems but is comparatively new for telephone train despatching use. As adapted to this use it consists of a mechanism to send out a predetermined number of electrical impulses to the line. The automatic call box accomplishes this. The way station mechanism is designed to receive these impulses in a relay which steps up a notched sector one step for each impulse.



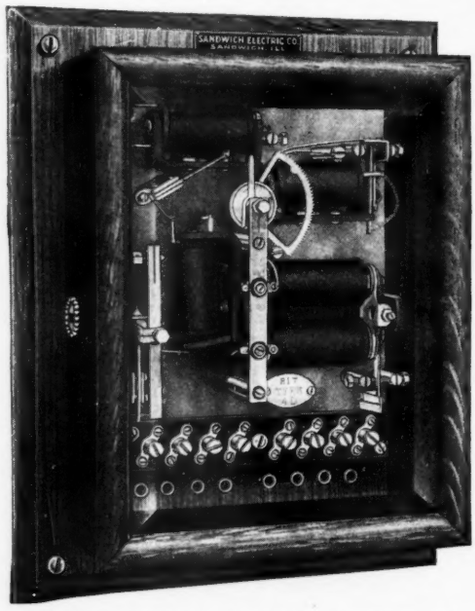
Sandwich Automatic Call Box.

Attached to the sector is a pointer which can be set to engage a contact spring after the sector has been stepped up the desired number of steps. Operating from this contact spring is a balance bar which consumes a definite amount of time before closing the vibrating bell circuit. This allows the selector to be stepped up to and past the number it is set for without ringing its bell. As the sector steps up it stops but a small fraction of a second on each notch while the step finger returns to engage the next tooth. This interval of time that the pointer is in contact with the contact spring is too short to allow the balance bar to fall over and ring the bell. Hence it is possible to step past without danger of a false ring.

To ring the bell it is only necessary to stop with the pointer in contact with the contact spring long enough to allow the balance bar to fall over. This rings the bell. Then the sector can be restored to normal, ready for another call.

The automatic call box which accomplishes this consists essentially of a notched wheel which engages a contact spring to send out to the line the current impulses. The front of the box has a dial with holes around the edge numbered to conform to the teeth on the notched wheel inside and which is rigidly fastened to the shelf. A simple mechanism allows the wheel to be rotated in one direction without sending any impulses and closes the circuit when the handle reaches a stop and is released. A spring, acting through gears, drives the mechanism, when released, at a constant speed, regulated by a governor.

The selectors at the way stations operate from a polar relay, current in one direction stepping up the sectors and a reversal of the current operating a release relay which trips the holding spring and sets the selector back to normal.



Sandwich Selector—Receiving Instrument.

In calling a station, number 10 for example, the call box handle is placed in hole number 10 and the dial turned clockwise until it hits a stop. This operation sends out a release impulse that will set at normal any selector that may have been stepped up by any cause. Now, by releasing the handle and the spring, which has been wound up in turning the dial to the stop, the despatcher revolves the character wheel anti-clockwise and thereby sends out 10 impulses, the last or tenth impulse being prolonged—a dash. Then comes a reversal of current which sets the selectors to normal.

The 10 impulses to the line step up every selector on the line 10 steps, but the one at station 10 is the only one whose pointer is set to make contact at the tenth point, and because the tenth impulse is long it allows the balance bar at station 10 to fall over and ring the bell. To continue the ring, or in other words, to give a long ring, it is only necessary to hold the dial and allow the last impulse to continue. The selectors on the numbers between one and 10 are stepped up so fast that their bells get no chance to ring.

The call box sends the impulses at the rate of 20 in four seconds, so that on an average line where there are not more than 25 stations any call can be made in less than six seconds.

A later type is arranged without the polar relay. As soon as the impulses stop, the release relay automatically sets the sector back to normal, the step up relay taking current direct from the line. This minimizes the consumption of local battery, which in this case is used only to operate the bell.

The main features claimed for the Sandwich system are flexibility, simplicity and high speed.

This equipment as furnished to the C., C., C. & St. L. includes an adjustable arm telephone with head band receiver. There is also provided a cordless jack box, which is made in two styles. The despatcher has the breast transmitter and head band receiver.

The Sandwich apparatus is made by the Sandwich Electric Company, Sandwich, Ill.